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THEOPHRASTUS: DE CAUSIS
PLANTARUM

BOOK ONE

TEXT, CRITICAL APPARATUS, TRANSLATION,
AND COMMENTARY

ROBERT EWING DENGLER

A THESIS

IN GREEK

PRESENTED TO THE FACULTY OF THE GRADUATE SCHOOL IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY

PHILADELPHIA

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The writer desires to express especial gratitude:
For sound instruction and inspiring scholarship,
to the Graduate Faculty in Greek and Latin at the
University, and especially to Professor William N.
Bates under whom this thesis has been prepared;

To the Founder and the Administrators of the
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and Fellowship that so materially aided his
graduate studies; and

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been impossible, and whose constant sacrifice and
loving ambitions for him from his childhood days,
may, as he hopes, be rewarded in some measure by
the satisfaction in their son's doctorate.

PREFACE

This work was begun three years ago in response to an expression of need for a modern language version of Theophrastus's philosophical study of plant physiology. It was decided to make the first book of the *De Causis Plantarum* the beginning of such a translation.

As a classicist, the writer, in order to prepare a translation, felt the need of establishing a revised text involving the collation of all available material and the creation therefrom of a thorough *apparatus criticus*. That this latter is written in the one universal language of scholarship will require, it is believed, no apology. The bibliography will indicate to what extent material has been assembled, and, in the more important instances, the sources from which such material has come.

Wimmer's Teubner edition of *De Causis*, having been regarded hitherto as the standard text, was at first naturally made the basis of the recension. But, in the course of comparison and collation, it soon became evident to the writer (and all reading since has confirmed the idea) that the real basis of our text was still the monumental work of Schneider, many of whose thoughts, if not actual conjectures, are presented in so ambiguous or non-committal a manner by Wimmer as to pass for his own. In spite of all his vagaries, Schneider appears to the present writer to have the sounder view of Theophrastus's meaning, as may be seen, it is believed, by anyone who will carefully study the *apparatus criticus* of this edition. In passing it might be said that notwithstanding repeated comment, to the effect that the Didot edition of Wimmer's text is inferior—as being disfigured by numerous misprints—to the Teubner text, the

fact is that, after a thorough collation of Book I, the opposite seems to be the case: the Didot text is perhaps more free from errors than is the Teubner; certainly it contains no greater number of mistakes than does the German edition.

Two sources of material of the first importance—the Urbinas and Gaza—seem, from all evidence clearly available, to have been here actually under the eye of the collator (though, of course in photostat) for the first time. Certainly so far as Urbinas is concerned, Schneider had only a collation of readings sent him by friends from Rome after the discovery of the manuscript in the Vatican, and Wimmer nowhere in any case or in any way indicates a reading of U that shows any independence of Schneider's readings of that manuscript, nor does Wimmer anywhere make any statement to that effect.

Of Gaza the case is not so clear, but Schneider, who uses him much more than does Wimmer, often is confusing, if not confused, in referring to various editions; he is not even certain, apparently, that the Tarvisian is the oldest. Oldest, however, it surely is, having the following colophon:

THEOPHRASTI DECAVSIS PLANTARVM LIBER SEX
TVS ET VLTIMVS EXPLICIT.

IMPRESSVM TARVISI IPER BARTHOLOMAEVM CON
FALONERIVM DE SALODIO. ANNO DOMINI. M. CCCC
.LXXXIII. DIE XX FEBRVARI.

The early pages of the volume contain the dedication to the Pope Nicholas V (died 1455) and thus furnish the lowest limit for the date of the work of translation. There is scarcely need to speak again of the value of G as involving, in all probability, Greek manuscript material now lost, though that material has been presumed to be much inferior to U. Quotations from G in the *apparatus* preserve the original spelling and punctuation.

Codex Urbinas is a beautiful MS of the twelfth century or earlier. For some general description and for evaluation of it as textual evidence, reference should be made to the introduction to Wimmer's 1842 edition of the *Historia*, and especially to Kirchner's dissertation. The pages containing the beginning of *De Causis* are shown in the frontispiece plate of the present edition, which has been made from the author's photostatic

copy and which reproduces the MS at about one-half its natural size. Some characteristics of the MS are: universal use of *nu* movable whether followed by a vowel or not—many of these have later been erased; only the simplest sorts of ligatures; the only abbreviation is the dash instead of final *nu* and this only at the end of the line; in medial position, where usually doubled, *rho* is in U almost universally single; *iota* in long diphthongs is always written adscript unless entirely omitted, which is rare; some rare instances of uncial letters in the text, notably of *nu*; a rather frequent omission of breathings and accents, though in general those that are indicated are accurate; numerous corrections and erasures made by a later hand apparently all at one time. The *apparatus* presents the exact readings of U (errors, omissions, etc.) with practically no employment of *sic*.

Scaliger's commentary is a work of real illumination especially for the study of the ancient viewpoint of the philosophy. It repays the careful attention necessary to understand it. The Greek citations in the *apparatus* from Scaliger are those phrases from *De Causis* quoted in his running commentary.

An explanatory commentary to the translation has been provided in the brief footnotes. Inasmuch as often the best way to explain an author's thoughts is to let him explain them himself, these notes consist mainly of references, by book, chapter, and section, to the *Historia Plantarum* (H.) and the *De Causis Plantarum* (C.) of Theophrastus. It is believed that a careful use of these cross references will be a real help toward such explanation. There have also been added references to Aristotle's zoological works, where will be found parallels and treatment of matters germane to this text. The passages referred to in Pliny's *Natural History* are, in many instances, obviously derived from the place in Theophrastus under discussion; others again are cited to throw, even though indirectly, some additional light on our author's concepts. Much use has been made, for plant names, of the splendid *Index* by Thistelton-Dyer in the second volume of the Loeb translation of the *Historia*; modern scientific names from that source are cited in the footnotes.

It is hoped that this first presentation of part of *De Causis Plantarum* in a modern vernacular may help to enlarge the

acquaintance with and the admiration for one of the finest figures in the history of Natural Science—a man who was no mean figure even by the side of the great Aristotle, his colleague—one whose observation and insight well earn for him the name of Father of Botany, and whose message, though couched in an elusive and condensed manner scarcely deserving the term style, yet justifies the myth about the changing of his name to Theophrastus.

Thanks are due, and are most gratefully rendered, to Dr. Rodney H. True, Head of the Department of Botany in the University, for his continued and enthusiastic encouragement of this study from the very start; to my former colleague, Dr. E. H. Heffner, Professor of Latin in the University, for his personal interest and aid in arranging for the publishing of the monograph; to my colleague, Mason Long, Associate Professor of English in the Pennsylvania State College, for his careful reading of the English translation; and, above all, to my wife, Mary Drummond Dengler, whose unflagging zeal and affectionate coöperation, together with a very real and helpful knowledge of Botany, have enabled me to reach a goal otherwise unattainable in the midst of crowding academic duties.

11 October, 1926.

EXPLICATIO SIGNORUM QUAE IN APPARATU CRITICO MEO
REPERIUNTUR

(IN BIBLIOGRAPHIA FIT PLENIOR DESCRIPTIO)

- U (*Codex Urbinas*): Codex Bibliothecae Vaticanae.
- U, rec. man.: Correctiones (accentus, spiritus, litterae, rasurae, etc.) a quodam alio ac primo scriptore factae, quae in codice passim apparent.
- M (*Codices Medicei*, "instar unius habendi"—Wmr.): Lectiones quae apud Sch, praecipue in *Ann* et *Auct* citantur.
- A (*Aldina*): Editio Princeps, Venetiis, 1497.
- G (*Gaza*): Versio Latina, Tarvisii, 1483.
- Scl (*Scaliger*): Lectiones apud Scl in Commentariis repertae, 1566.
- Hns (*Heinsius*): Editio Graece et Latine, Amstelodami, 1613.
- Sch (*Schneiderus*): Editio (V voll.), Lipsiae, 1818, 1821.
- Sch-ann: Annotationes ad Causas Plantarum (in vol. IV).
- Sch-auct: Auctuarium lectionum variarum (in vol. V).
- Sch-cur: Curae secundae (in vol. II).
- Sch-syl: Syllabus emendandorum, etc. (in vol. V).
- Sch-txt: Textus graecus (in vol. I).
- Apud Sch reperias etiam conjecturas, lectiones, quae sequuntur:
- Ald-Bas: Editio secunda Aldina (cur. Oporino), Basil., 1541.
- Ald-Cam: Editio tertia Aldina (cur. Camotio), Venetiis, 1552.
- Bcr: Bucretius
- Dlc: Dalecampius (Hist. Plantarum Univ. et Plin. N.H. Editio).
- Hfm: Hofmannus.
- Lnk: Linckius (cum Sch edidit opera Theoph.)
- Mld: Moldenhauerus (Tentamen in Hist. Plant.)
- Mrs: Meursius.
- mrg-Vsc: margo Vascosa.
- Vnr: Vinarius
- Wmr (*Wimmerus*): Editio Teubneriana (III voll.), Lipsiae, 1854, 1862.
(quae editio apud me non nominatim citatur nisi lectionem praebeo quam eadem non habet.)
- Wmr-Did (W.-Didot): Editio Graece et Latine, Parisiis, 1866.
- Hndlng (*Hindenlang*): Sprachliche Untersuchungen, etc., Argentorati, 1910.
(Quae restant signa facile se explicabunt.)

ΘΕΟΦΡΑΣΤΟΥ
ΠΕΡΙ ΦΥΤΩΝ ΑΙΤΙΩΝ
Α

Ι. Τῶν φυτῶν αἱ γενέσεις ὅτι μὲν εἰσι πλείους καὶ πόσαι καὶ τίνες ἐν ταῖς ἱστορίαις εἴρηται πρότερον. ἐπεὶ δὲ οὐ πᾶσαι πᾶσιν, οἰκείως ἔχει διελεῖν τίνες ἐκάστοις καὶ διὰ ποίας αἰτίας, ἀρχαῖς χρωμένους ταῖς κατὰ τὰς ἰδίας οὐσίας· εὐθὺ γὰρ χρή συμφωνεῖσθαι τοὺς λόγους τοῖς εὐρημένοις.

ἡ μὲν οὖν ἀπὸ τοῦ σπέρματος γένεσις κοινὴ πάντων ἐστὶ τῶν ἐχόντων σπέρμα· πάντα γὰρ δύναται γεννᾶν. τοῦτο δὲ καὶ τῇ αἰσθήσει φανερόν ὅτι συμβαίνει, κατὰ δὲ τὸν λόγον ἴσως ἀναγκαῖον. ἡ γὰρ φύσις οὐδὲν ποιεῖ μάτην, ἥκιστα δὲ ἐν τοῖς πρώτοις καὶ κυριωτάτοις· πρῶτον δὲ καὶ κυριώτατον τὸ σπέρμα, ὥστε τὸ σπέρμα μάτην ἂν εἴη μὴ δυνάμενον γεννᾶν, εἴπερ τούτου χάριν αἰεὶ τὸ σπέρμα καὶ πρὸς τοῦτο πέφυκεν.

(2) ὅπερ ἐκ τῶν ἄλλων πάντων λαμβάνειν ἐστὶν ὁμολογούμενον. ἀλλὰ διὰ τὸ μὴ χρῆσθαι τοὺς γεώργους ἐπ' ἐνίων, ὅτι θάττον ἀπ' αὐτομάτων παραγίνεται, καὶ διὰ τὸ μὴ εἶναι ῥαδίως ἐπὶ τινων λαμβάνειν μήτε τῶν δένδρων μήτε τῶν ποιωδῶν τὰ σπέρματα, διὰ ταῦτ' οὐκ οἶονται τινες πάντ' ἀπὸ σπέρματος ἐνδέχεσθαι. καίτοι, καθάπερ ἐν ταῖς ἱστορίαις

De titulo operis: ΠΕΡΙ ΦΥΤΩΝ ΑΙΤΙΩΝ Α U; ΘΕΟΦΡΑΣΤΟΥ Π· Φ· Α· Τὸ Α' Ald Wmr; ΘΕΟΦΡΑΣΤΟΥ ΑΙΤΙΩΝ ΦΥΤΙΚΩΝ ΤΟ Α Sch (cum Athen. 2. 55. e, etc., Αἴτια Φυτικά); "libros Theophrasti . . . qui inscribuntur . . . φυτικῶν αἰτιῶν" Varro R. R. 1. 5. 1; THEOPHRASTI DE CAUSIS PLANTARUM G Hns Scl et ceteri.

1. ἐπεὶ δ' οὐ U;—δὲ οὐ A Hns Sch Wmr. | πᾶσαι πᾶσιν U (et ante Ms repertum conj. Sch); πᾶσαι om. A Hns; *quum non omnes omnibus conueniant* G. | οἰκείως ἔχειν U (ν eraso) A Hns; οἰκεῖαι <δεῖ> Sch-txt. | διελεῖν U M; διελλθεῖν A Hns; *apte profecto agetur* G. | ἀρχαῖς χρωμένους ταῖς conj. Wmr; οὐχ αἰς (※in A, cf. Sch Tom. II, p. 487 et p. 490) χρ. τὰς U A; οὐχ ἑτέροις ἢ αἰς τὸ πρῶτον χρώμενοι· ἦτοι ταῖς Hns; <οὐχ αἰς> χρ. ταῖς Sch-txt; αἰτίας ἀποδίδοαι μέλλουσι κατὰ τὰς κτλ. Ald-Cam, unde ἀποδίδοσθαι μέλλουσι κτλ. conj. Scl; ἀρχαῖς . . . εὐρημένοις om. G. | οὐσίας <διαφοραῖς> εὐθὺ Sch ex Hns, qui (ex Ald-Cam) πειρατέον εἰπεῖν ante εὐθὺ addit. | εὐρημένοις A; εἰρημ. U Hns. "*quia non omnibus omnia; competunt; necesse est privatim quid cuique speciei debeat, deducere ad causas usque . . . Quia . . . animaduertere oportet, quemadmodum ratio cohaereat narrationi*" Scl. | τῇ αἰσθ. U (ut ubique). | οὐδὲν ποιεῖ A; οὐδ. μὲν π. U M Sch-txt. | ἥκιστα δ' ἐν U Sch-auct; μὲν . . . δέ: *quum . . . tum* G. | κυριωτάτοις:

THEOPHRASTUS: DE CAUSIS PLANTARUM

I

Concerning plants, their numerous means of reproduction, the variety of these means, and their kind have been told in the *Historia*.¹ But since not all these means are alike for all plants, we must here distinguish what the ways are in each plant and why, considering the vital principles² of each in its essential character; for our account must forthwith agree with our observation. Now propagation from seed is common to all plants that have seed, for all these plants can reproduce themselves. It is clear that this statement agrees with our observation, and it is likewise logically necessary; for Nature does nothing in vain, least of all in her chief and principal matters. Now seed is a matter of the very first importance; but truly it would be a vain thing, could it not reproduce the plant, since it is on account of reproduction and to that purpose that seed is constantly being produced.

Seed, it is agreed, may be secured from all plants in general; but because it is not used by the husbandman in the case of some plants, since they grow more quickly of their own accord,³ and because it is difficult in some plants, be they woody or herbaceous, to get the seed, there are some who think that not all plants come from seed. As was said, however, in the *Historia*,⁴

¹ Cf. H. 3, Chap. 1.

² ἀρχή, a very common term in Th. and Arist.; cf. e.g. Arist. *G. A.* 4: 1 (765b 11), "by principle I do not mean a material principle out of which comes into being an offspring resembling the parent, but I mean the first moving cause, whether it have power to act as such in the thing itself or in something else." (Trans. Arthur Platt).

³ Schneider conjectures: from slips.

⁴ H. 2. 1. 2; H. 2. 2. 4; H. 2. Chaps. 3 and 4.

finis rationem inspectat add. G. | εἴπερ: forsitan hic et passim ἐπείπερ malim; *si quidem* G. | ἀεὶ A Hns Sch; αἰεὶ U (passim) Wmr.

2. ἀπ' αὐτομάτου Scl; sponte G; pro αὐτομόλων(?) Sch-cur. | παραγίνεσθαι: *prodeunt* *adolescuntque* G. | εἶναι ῥαδίον Mg-Vsc; ῥαδίως U. | ποιῶδων U (iota eraso) ποῶδων A Scl Hns. | διὰ ταῦτ' U M; —τοῦτ' A Hns Sch-txt. | πάντ' Wmr; πάνν U M A Sch; πάντα φέειν Hns; *semine creari omnia posse* G. | ἀπὸ σπέρμ. U;

εἴρηται, καὶ φανερώτατον ἐπὶ τῶν συκῶν. ἔτι δὲ κατ' ἄλλον τρόπον ἢ βλάστησις αὐτῶν, εἴ τι τῶν αὐτομάτων ἐκ συρροῆς καὶ σήψεως, μᾶλλον δὲ ἀλλοιώσεως γινομένης φυσικῆς. ὅτι μὲν οὖν κοινὴ πᾶσιν ἢ διὰ τοῦ σπέρματος γένεσις φανερόν. εἰ δ' ἀμφοτέρως ἔνια, καὶ αὐτόματα καὶ ἐκ σπέρματος, οὐδὲν ἄτοπον· ὥσπερ καὶ ζῶά τινα, καὶ ἐξ ἀλλήλων καὶ ἐκ τῆς γῆς.

(3) διὸ καὶ αἱ γενέσεις κατὰ τὰς ἰδίας ἐκάστων φύσεις. ὅσα μὲν γὰρ ξηρὰ καὶ μονοφυῆ καὶ ἀπαράβλαστα, ταῦτ' οὐδεμίαν, ὡς εἰπεῖν, δέχεται φυτεῖαν οὔτε ἀπὸ παρασπάδος οὔτε ἀπὸ ἀκρεμόνος· τὴν μὲν ἀπὸ παρασπάδος τῷ μὴ ἔχειν τὰ μονοφυῆ, τὴν δὲ ἀπὸ ἀκρεμόνος καὶ κλωνὸς διὰ τὴν ξηρότητα. αἰεὶ γὰρ τὸ μέλλον βλαστάνειν ἔχειν τε δεῖ τὴν ἔμβιον ὑγρότητα καὶ ταύτην δύνασθαι τηρεῖν. τὰ δὲ φύσει ξηρὰ διὰ τὸ ὀλίγην ἔχειν, ὅταν ἀπὸ τοῦ δένδρου ἀφαιρεθῇ, ταχὺ διαπνέεται καὶ <ἐξ> ατμίζεται συνεξάγονθ' ἅμα καὶ τὸ σύμφυτον θερμόν. (4) καὶ ταῦτα μὲν διὰ τὰς εἰρημένας αἰτίας. τὰ δὲ παραβλαστικά καὶ <οὐ> μονοφυῆ συμμετρίᾳ τινὶ τοῦ θερμοῦ καὶ ὑγροῦ δέχεται καὶ τὰς ἄλλας δυνάμενας τηρεῖν τὴν ὑγρότητα καὶ θερμότητα τὴν ξύμφυτον, ὥστε βλαστάνειν μὴ μόνον ἀπὸ παρασπάδος ἀλλ' ἔνια καὶ ἀπὸ τῶν ἄκρων οἶον συκὴ καὶ ἄμπελος καὶ τῶν ἀκάρπων

ἀπὸ τοῦ σπέρμ. A Hns Sch-txt. | ἐνδέχασθαι: ἐγγίγνεσθαι conj. Dlc. | καίτοι U; καὶ τοῦτο conj. Dlc.; *quamquam* (*quod ap.* Hns) *id in fisis* G. | καὶ φανερώτατον U M; καὶ om. G A Hns Sch-txt. | εἴ τι τῶν Wmr; εἰ μὴ τι τῶν U A Hns; μὴ *omittendum* aut in δὴ *mutandum* cens. Sch; *nisi quid* G. | εἶνια | Hns. | ὥσπερ: *quandoquidem* (ἐπεὶ περ?) G. | ἐξ ἀλλήλων A; ἐξ αλων, cum lla correctoris manu superscriptis, U.

‡ 3. Lacunam inter hanc et priorem sectionem susp. Sch. | διὸ cum U A Scl Hns Sch-txt et, ut videtur, M ubique restitui, δι' δ Wmr (ubique). *μονοφυ.* (ultima littera erasa) U. | *μονοφυῆ* . . . ἀπαράβλαστα: *simplicia minusque plantigera* G. | *παρασπάδος: auulsionis* G. | *ἀκρεμόνος* U sed alter accentus a correctore additus esse videtur; *ἀκρέμονος* A Scl Hns Sch-txt; *rami* G. | δεῖ A; δεῖν U (sed nu eraso). | τῷ μὴ ἔχειν corr. Sch; τοῦ—U A Hns; τὸν—Scl. | τὴν: *aliquem* G (pro τινά?). | ἔμβιον U; ἔμβριον M (“hic et ubique”); ἔμβριον A Scl (“i. e. ἔμφυτον” Scl) Hns Sch-txt; *ingenitum* G. | διὰ τὸ ὀλίγην ἔχειν: (siccis) *negatum penitus est* G; <ὕγρότητα> post ἔχειν Sch solus. | ἐξατμίζεται Hns; ατμίζεται U A Scl. | *συνεξάγονθ'* M A et U (sed θ addito post); *συνεξάγειν* τε aut prius τε *delendum* cens. Scl; *simul* . . . *calorem* . . . *amittunt* G. | καὶ ταῦτα . . . αἰτίας: *Haec ob eiusmodi causas nequeunt germinare* G.

4. —αἰτίας. τὰ δὲ παραβλαστικά καὶ <οὐ> μονοφυῆ συμμετρίᾳ τινὶ τοῦ θερμοῦ καὶ ὑγροῦ δέχεται καὶ τὰς ἄλλας δυνάμενας τηρεῖν κτλ. Hindenlang (pp. 35 s.)

the possibility of such growth is quite evident even in figs.⁵ In still other manners do plants come into being, as for example: spontaneously, that is by conflux and decay, or even more by natural change⁶ that takes place.

Now it is clear that reproduction by seed is common to all plants. If some of them have both ways of reproduction, namely, by spontaneous generation as well as from seed, that is a marvel no greater than that of some animals, which produce either from their own kind or out of the earth.⁷

Therefore the method of generation of each plant follows its own proper nature. For such as are dry and of unbranched trunk⁸ and without buds⁹ from the roots admit practically no sort of vegetative reproduction by slip or cutting of either branch or twig. In the first place they do not grow from slipped branches¹⁰ because non-branching trunks furnish none; in the second place, they do not grow from a twig cutting¹¹ because of their dryness. For always the part that is going to bud must possess the vital moisture and be able to retain it. Now parts that are by nature dry, because they have little of this moisture, when they are removed from the tree, soon expire and dry up and, at the same time, give up their natural warmth.¹² For the reasons given, therefore, these things happen.

But those trees that are branched and not single-trunked admit also the other kinds of planting¹³ because of a certain balance of heat and moisture, since they can retain their innate moisture and warmth and so grow; and this they do not only from slips, but also from tips of branches, such as fig and vine.

⁵ Normally grown from cuttings. See Bailey s.v. *Ficus* and *Figs*.

⁶ "Transmutation" (see Green, p. 135 ff.); our modern term is bud-mutation. It is common in citrus fruits.

⁷ On abiogenesis cf. H. 3. 2. 4; Arist. *H. A.* 5: 1. But perhaps Th. himself questioned it; cf. C. 5. 4. 5, 6.

⁸ *E. g.* like palm; cf. H. 2. 6. 9.

⁹ "Without suckers," L. and S.

¹⁰ "A shoot torn off and planted," L. and S.; *stolone avulso*, Wmr.

¹¹ Cf. H. 2. 1. 1 and 2; C. 5. 1. 3; C. 1. 12. 9. (Can Th. by twig mean a compound leaf?).

¹² H. 1. 11. 1; C. 5. 12. 4; C. 6. 7. 1.

¹³ *I. e.* vegetative reproduction.

δὲ καὶ φιλῦδρων ὥσπερ ἰτέα καὶ ἀκτῇ καὶ λεύκη καὶ αἷγειρος. καθόλου μὲν οὖν καὶ τύπῳ τοῦτον διωρίσθω τὸν τρόπον.

II. οὐ μὴν ἀλλὰ μάλιστ' <ῆ> μόνος τῶν ξηρῶν καὶ μονοφυῶν καὶ ἀπαραβλάστων ὁ φοῖνιξ δέχεται καὶ ἑτέρας γενέσεις παρὰ τὴν σπερματικὴν. τὰς τε γὰρ ῥάβδους φασὶ μισχεύειν περὶ Βαβυλῶνα τὰς ἀπαλωτάτας, καὶ ὅταν ἐμβιώσωσι μεταφυτεύουσι· καὶ ἐν τοῖς περὶ τὴν Ἑλλάδα τόποις ἂν ἀποκόψας τις τᾶν φυτεύσῃ ῥιζοῦσθαι. καὶ βλαστάνειν οὐκ ἀπὸ τοῦ ἐγκεφάλου μόνον ἀλλὰ καὶ κάτωθεν αὔξειν τὰς ῥίζας. ἔτι δὲ ἂν πλάγιος τεθῇ καὶ ἔνικμος ἢ γῇ τυγχάνῃ, πολλαχόθεν ῥιζοφύειν καὶ ἐκβλαστάνειν, οὐ μέντοι μέγεθος τοῦτο λαμβάνειν.

(2) ἐπὶ δὲ πύκνης καὶ ἐλάτης καὶ εἴ τι παραπλήσιον τούτοις, οὐδὲν συμβαίνει τοιοῦτον, οὐδ' ἐπὶ κυπαρίττου πλὴν εἴ τί που καὶ παραβλαστάνει, καθάπερ φασὶν ἐν Κρήτῃ περὶ τοὺς καλουμένους δρυῖτας· ἐνταῦθα γὰρ οὐδὲν ἄλογον, ὥσπερ καὶ τὰς ἄλλας παραφυάδας ὑπορρίζους οὔσας καὶ

cum Sch. et Mld. (qui autem φυτέας post ἄλλας inserunt); αἰτίας. τὰ δὲ ἀπαραβλάστα συμμετρίᾳ . . . ὑγροῦ καὶ μονοφυῆ δέχεται . . . ἄλλας δύναται τηρεῖν κτλ. U A (et U punctum post ἀπαραβλάστα et ὑγροῦ et δέχεται habet); *Caetera nimirum queunt: ut pole: quae media quadam temperie caloris: humorisque: constant. Valeantque humorem caloremque sibi insitum: diucius conseruare* G (qui legisse videtur:—αἰτίας οὐ παραβλαστάνει, δέχεται δὲ τὰ ἄλλα, ἃ συμμετρίᾳ τινὶ τοῦ . . . ὑγροῦ πέφυκε (?) καὶ δύναται τηρεῖν κτλ);—αἰτίας, τὰ ἀπαραβλάστα καὶ μον. ἀσυμμετρίᾳ . . . ὑγροῦ. δέχεται δὲ τὰς ἄλλας ἃ δύναται τηρεῖν κτλ. Wmr. | μὴ μόνον U Hns; οὐ μόνον Scl; καὶ μόν. A Sch-txt; *non modo* G. | συκῇ U; (male igitur de hoc Ms. Sch: “*συκῇ hic et ubique*”). | ἀκτῇ Sch recte (et ut videtur U), i. e. ἀκτέα, cf. *sambucus* G; ἀκτῇ A Hns Wmr (male). | λείκει U (eraso ει). | διορίσθω A Hns.

1. οὐ μὴν . . . <ῆ>: *Caeterum* G (simplicius). | μάλιστ' <ῆ> μόνος conj. Sch; μάλιστα μόνος U A Scl (—μόνον); *palma sola* G. | ἀπαραβλάστων: *ex nepotum exortia* G (et quae non germinant G ap. Hns). | φοῖνιξ (sic) U (“*ubique*” Sch) et Scl passim. | τὰς ῥάβδους . . . μεταφυτεύουσι: *Virgas enim tenerrimas babylonios uiuiradices efficere: adultasque transferre accepimus* G, (μισχεύεσθαι . . . μεταφυτεύεσθαι?). Verba τὰς τε γὰρ ῥά—repetuntur in capite novae paginae U. | τᾶν . . . ῥιζοῦσθαι corr. Sch; ἄνω . . . ῥιζοῦσι U A Hns. καὶ ἐν τοῖς . . . φυτεύσῃ: *Quin et Graeciae: si quis ramos supernos decisos serat:* G. | πλάγιος τεθῇ Sch e G; πλάγιος ἐν ᾧ U A; πλάγιως ἐν ᾧ Hns; *si truncus inuersus deponatur* G. | ἔνικμος Scl mend. pro ἔνικ. | τυγχάνει U.

2. οὐδὲν συμβαίνει τοιοῦτον U M Sch; τ. σ. ο. A Hns. | παραβλαστάνει: *ab imis plantigerum exurgat* G. | δρυῖτας U A Scl Hns; δρυῖτας M; (Scl esse nomen loci

Some also of those that are barren and fond of water¹⁴ reproduce vegetatively, for example: willow, elder, white poplar, and black poplar. As a general outline let these be regarded as the types of reproduction.¹⁵

II

Now among plants that are dry and simple-trunked and unbranched the palm is the chief if not the only example that permits methods of propagation other than by seed. At Babylon,¹ it is said, the tenderest shoots² are set. Then, when they have struck, they are transplanted. In Greek lands too if the upper part is cut away and planted it is said to take root.³ Not only is there growth from the terminal bud,⁴ but also is there multiplication in the roots below. Furthermore if the palm⁵ is pushed over on its side, where the ground happens to be humid, it will root in a number of places and produce shoots; these however attain to no great size.

In the case of fir, silver fir, and similar trees no such growth occurs; nor does it in cypress except that occasionally this tree branches at the root as does, they say, the tree in Crete⁶ called Dryites. For there it is not unreasonable that these too should bud and grow just as do the suckers⁷ from other trees

¹⁴ H. 1. 14. 3; H. 3. 1. 1.; H. 4. 8. 1.

¹⁵ Cf. H. 2. Chaps. 5, 6.

¹ H. 2. 2. 2 and 8; H. 2. 6. 3, 4.

² Bailey, p. 2438. Some species of *phoenix* have the soboliferous habit, throwing up a number of shoots from the base of the plant. Cf. also the doum palm (*Hyphaene thebaica*) in Bailey. H. 1. 10. 5; H. 2. 6. 9, 10; H. 4. 2. 7.

³ H. 2. 6. 2.

⁴ Lit. brain; cf. Xen. *Anab.* 2. 3. 16.

⁵ Plin. *N. H.* 13: 36 ff. (8); Xen. *Oec.* 19: 9 f., of cuttings.

⁶ H. 2. 2. 2; Cypress-oak (?).

⁷ H. 2. 2. 4.

credit); *circa deyitas uocatos* G (**deutirs*? e *deúō*=*δέω*, quae vox *truncum resectum* significare possit). *δρυίτης* <*δρῦς* (?); cf. Bois. p. 202. | *οὐδὲν ἄλογον* M; *ἄλ. οὐδ.* A Hns. | *ὥσπερ* corr. Sch; *ὥστε* U A Hns. | *ὑπορίζ.* U et simile

ἐνύγρους, καὶ ταύτας βλαστάνειν· ἐπεὶ εἴ γε μὴ ἦσαν ὑπόρριζοι χαλεπὸν ἢ ἀδύνατον. τοῦτο μὲν οὖν ὥς πρὸς ὑπόθεσιν λεγόμενον.

(3) ὁ δὲ φοῖνιξ ἀπὸ μὲν τῶν ῥάβδων βλαστάνει χώρας εὐβοσίᾳ καὶ εὐφυίᾳ πρὸς τὸ θάττον βλαστάνειν. τὸ δ' ἀπὸ τῶν ἀπαλωτάτων εὐλογον εἰ ὑγρόταται αὐταὶ καὶ γεννητικώταται. ἀπὸ δὲ τοῦ ἐγκεφάλου διὰ τῶν ὑποκάτω μᾶλλον ἔτι τοῦτο εὐλογον· ἐντεῦθεν γὰρ καὶ ἡ τῶν ῥάβδων φύσις καὶ ὅλως οἷον ἀρχὴ τις αὕτη ζωτική. διὸ καὶ ἐξαιρουμένου καὶ πονήσαντος θνήσκει· ἐπεὶ καὶ ἡ ἐκ τῶν πλαγιῶν ἔκφυσις ἔχοντός ἐστι τὸν ἐγκέφαλον· ἐξαιρουμένου γὰρ αὐαίνεσθαι κατὰ λόγον, εἴπερ καὶ πεφυκός καὶ ἐρριζωμένου τοῦτο συμβαίνει. (4) ἡ δὲ ἔκφυσις δῆλον ὅτι πανταχόθεν· πανταχοῦ γὰρ διαμένει μέχρι τινὸς ἢ ὑγρότης καὶ ἢ θερμότης, διὰ τὸ μὴ εὐξήραντον εἶναι τῇ πυκνότητι τῶν πόρων, διὸ καὶ δυσδιάπνευστον. ὁ μὲν οὖν φοῖνιξ διὰ ταῦτα πλεοναχῶς γίνεται. τῶν δὲ ἄλλων τῶν μονοφυῶν οὐδὲν διὰ τὸ μὴ τοιαύτην ἔχειν τὴν φύσιν.

III. Ὅσα δὲ πλείους γεννᾶται τρόπους, ἔχει καὶ ἐν αὐτοῖς διαφοράν. τὰ γὰρ ἀπὸ παρασπάδος καὶ ῥίξης καὶ κλωνὸς οὐ πάντως δύναιτ' ἂν καὶ ἀπὸ ξύλου καὶ ἀπὸ ἀκρεμόνος καθάπερ ἄμπελος καὶ συκῇ, τὰ δὲ πάλιν

ubique. | ἐνύγρους Sch e mrg-Vsc; ἐνύδρους U A Scl Hns. | ὥσπερ . . . ἐνύγρους: quod (quin ap. Hns.) caetera quoque proles: dummodo radice aliqua confibretur: humoremque habeat G.

3. εὐβοσίᾳ: frugalitate G. | ἀπαλωτάτων Hns. | εἰ ὑγρόταται αὐταὶ U; εἴπερ ὑγρότ. αὶ τοιαῦται καὶ γενν. conj. Sch-ann; εἰς ὑγρότητα τοιαῦτα A; ἔτι ὑγρότατα ταῦτα Hns; ὅτι ὑγρότατα τὰ τοιαῦτα Sch-txt; vid. Hindenlang, p. 33. | καὶ γεννητικώταται corr. Sch; καὶ τμητικώταται U; κ. τμ' τατα A Scl Hns Scht-txt. | εἰ ὑγρότ. . . . γεννητικ. : Tenerrimae uero uirgae petuntur quia tales humidissimae sunt G. | διὰ U A Hns; ἢ διὰ Scl Sch-txt; potius quam imis partibus G. | ἔτι U; ἐστὶ A Hns Sch-txt. | τούτων (sic) U solus (pro τοῦτο). | καὶ πονήσαντος U A Scl Hns; ἢ πονήσαντος maluit Sch; aut morbo aliquo laborante G. | διὸ . . . θνήσκει U; mox palma emoritur G. | τῶν πλαγιῶν U A Scl Hns; τοῦ πλαγίου Sch-txt; nepotum G. | εἴπερ U A Scl Hns; ὥσπερ Scl,—6. 1. D, (per mendum?) | ἐριζομένου U. | εἴπερ . . . συμβαίνει: siquidem et cum palma integerrima stat; et radicibus plene adhaeret hoc idem eueniat: cerebro sublato: necesse sit G.

4. δυσδιάπνευστον corr. Hns; δυσκάπνωτον U; δυσδιάπρωτον M; δυσιάπρωτον A; δυσδιάπνωτον maluit Scl; exhalatu difficilis G. | πλεοναχῶς U. | μονοφυῶν corr. Hns (e G: quae simplici corpore ueniunt); δημοφυῶν U M A. | οὐδὲν: diuersis prouenire modis asseritur add. G.

which take root and contain moisture. For, if they were not rooted, it would be difficult, if not impossible, for them to grow. This statement is made by way of suggested explanation.

The palm springs from young shoots because of the richness of the soil, which is conducive to more rapid sprouting. As for the growth from the tenderest parts, that is logical since these are the most moist and therefore the most productive. From the terminal bud through the parts below it,⁸ growth is still more to be expected; for the leaf stalks find their origin there, which in general is, as it were, a sort of life principle.⁹ When therefore this terminal bud is removed or diseased, the tree dies. The growth too from the palm lying on its side takes place only when the tree has this bud; for when that is taken away, the tree must naturally dry up, just as would happen were the tree growing in the normal way, upright and on its roots.

Budding forth is clearly possible from all parts of the plant; for everywhere, to a certain extent, there is the presence of moisture and warmth because the tree is not easily dried up, owing to the density of its vessels making evaporation difficult. The palm then, for these reasons, starts life in a variety of ways. Of the other simple-stemmed trees there is not a single instance of variety in propagation because they have no such nature.

III

As many however as are engendered in a number of ways have also their mutual differences. For those that grow from a cutting or a root or a twig, as for example vine and fig, could not in any case be expected to spring also from the heart wood or from a large branch, nor on the other hand might they any more than the olive come from buds. In each case there is the same or a similar reason. For vine and fig and others like them have their central portions dry, woody, and, in the case of some,

⁸ See Plin. *N. H.* 13:39 (9) and note 28 in Bohn trans. ad loc.

⁹ See Sister Thos. Aquin. Diss.

<οὐκ> ἀπὸ τῶν βλαστῶν ὥσπερ καὶ ἡ ἐλάα. τὸ δὲ αἰτίον ἐν ἀμφοῖν ταύτων καὶ παραπλήσιον. ἀμπέλου μὲν γὰρ καὶ συκῆς καὶ τῶν ἄλλων τῶν τοιούτων ξηρὰ καὶ ξυλῶδη τὰ μέσα, καὶ ἐνίων τραχέα, τὸ δὲ τραχὺ δυσβλαστές· τὰ δὲ ἄκρα καὶ ἀπαλὰ καὶ ἔννυγρα καθάπερ τὸ κλῆμα καὶ ἡ κράδη· καὶ ἐπὶ τῆς ἰτέας δὲ καὶ τῶν ἄλλων ὁμοίως. (2) ἐλάας δὲ τὰ μὲν τῶν ἀκρεμόνων ἔνικμα διὰ τὴν λιπαρότητα καὶ πυκνότητα καὶ ἀμφοτέρως ἀξήραντα, τὰ δ' ἄκρα διὰ λεπτότητα ξηρὰ καὶ οὐ δυνάμενα διαμένειν. ὡσαύτως καὶ ἀπίου καὶ ἀμυγδαλῆς καὶ μηλέας καὶ δάφνης καὶ ἄλλων· ἀβλάστητα γὰρ τὰ τούτων διὰ τὴν αὐτὴν αἰτίαν, πλὴν εἴ τι σπάνιον καὶ ὥς ἐν παραλόγῳ· καὶ γὰρ τὸ ἀπ' ἀκρεμόνων ἐνίων σπάνιον οἶον ἀμυγδαλῆς. δάφνην δὲ ἀδύνατον, ἐπεὶ οὐδὲ ἀπὸ παρασπάδος θέλει ῥαδίως. αἰτία δ', ὥσπερ ἐλέγομεν, ἡ ξηρότης καὶ τούτου γ' ἔτι ἡ μανότης· ἀσθενέστερον γὰρ καὶ πρὸς τὸ διατηρῆσαι ἐπὶ πλεῖον τὸ μανόν.

(3) ὅσα δὲ καὶ ἀπὸ ξύλων ἔμβια καὶ δύναται βλαστάνειν, οἶον ἐλάα, μύρρινος, κότινος, καὶ αὐτὰ τῇ πυκνότητι, καθάπερ ἐλέχθη, τηρεῖ τὴν ζωτικὴν ἀρχήν, ἔχοντά τινα ὑγρότητα τοιαύτην. οὐ γὰρ ἱκανόν, ἐὰν ᾧ πυκνόν γε, εἰ ξηρόν καὶ ἀπαράβλαστον· ἔτι δὲ καὶ ἡ παραβλάστησις τῶν τοιούτων διὰ τὸ πρεμνώδη καὶ συνεστραμμένην πῶς εἶναι τὴν ῥίζαν, ὥσπερ καὶ

1. <κατὰ> ante pléous maluerit Sch. | γεννᾶται: exeunt G. | αὐτοῖς corr. Scl et habent Sch Wmr-Did; αὐτ. U A Hns Wmr; *his ipsis* G. | τὰ γὰρ A; τὸ γὰρ U M. | ξύλου U. | <οὐκ> Wmr cum Scl et G; τὰ δὲ <ἀπὸ τούτων> πάλιν <οὐ δύναται> ἀπὸ Sch e Plin; τὰ δὲ πάλιν ἀπὸ ξύλου μὲν καὶ ἀκρέμονος οὐκ ἀπὸ βλαστῶν δὲ dicendum cens. Scl; τὰ δὲ πάλιν ἀπὸ U A Hns; *neque quod contra his ipsis proueniat ramulis etiam potest:* G. | ἐνίων τραχέα Sch;—τραχέα Scl;—τραχῇ Hns;—τραχὺ U M A; *nonnullorum asperae* (sc. partes) G. | ἄκρα καὶ U; καὶ om. A Hns Sch-txt; *contra facile* (sc. *germinare possunt*) *quae summe tenerae humectaeque sunt.* G. | κλήμα U; sed κλῆμα recentioris manus, (neque verum quod dicit Sch: "κλήμα, sic ubique U.") | κράδη corr. Hns (e Scl: κράδα); καρδία U M A; crada G.

2. ἐπὶ τῆς Wmr; τὰ τῆς conj. Sch; ἡ τῆς U A Hns; *salicis uero caeterorumque partes non secus se habent* G. | ὁμοίως U A; ὁμοίων maluerit Sch cum mrg-Vsc. | ἐλάας κτλ.: *oleae continue rami* G. | καὶ ὁ ἀμφοτέρως (ὁ erasum) U. | ἀξήραντα conjicio; <οὐκ> εὐξήραντα Hns. cum G et Scl (: "ἀρρhone negationem"); οὐκ om. U A; *exsiccatu proinde difficiles sunt* G. | διάμενα (in—ειν recentiore manu correctum) U. | ἀμυγδαλῆς corr. Sch;—δάλης U A Hns. | ἀβλάστητα U A Scl Hns; ἀβλαστα olim susp. Sch. | πλὴν εἴ τι Wmr; πλὴν καὶ εἴ τι U Hns; πλὴν εἴ τι καὶ Sch; *praeterquam si quid raro* G. | ὥς ἐν παραλόγῳ U Scl; ὥς παραλόγῳ MA; ὥς παράλογον Hns Sch-txt. | τὸ ἀπ' U Sch; τὸ ἀπὸ A Hns. | θέλει U; ἐθέλει

rough, this roughness making budding difficult; but the tips are tender and moist like vine twigs and the quivering spray of the fig, as is seen also in willow and others.

In olive some of the larger branches are moist because of their oiliness¹ and density, and, for both these reasons, are not easily dried out. But the tips, because of their delicateness, are dry and cannot endure, which fact is true also of pear, almond, apple, laurel, and others. In these plants for the same reasons the parts mentioned do not sprout when planted except in very rare and extraordinary instances. For as a matter of fact budding does, on very rare occasions, occur from a few boughs, as in almond. But this is impossible for the laurel, since it will not grow readily even from a torn-off shoot.² The reason, as we were saying, is its dryness and still more the looseness of its texture;³ for any loose textured growth⁴ is too weak to retain for a long time its moisture and warmth.

As many, though, as have life actually in their woody parts and can sprout, as olive, myrtle, wild olive—these, by their density, as was said, keep the vital principle inasmuch as they possess some such moisture. For it is not enough that they be simply dense if they are dry and have no side growths.⁵ Moreover the ability of such plants to produce side shoots lies in their roots being trunklike and in a measure twisted, as in

¹ C. 5. 16. 4.

² H. 2. 1. 3.

³ C. 3. 7. 1.

⁴ C. 1. 8. 2. (See also C. 2. 11. 1; C. 5. 13. 4.)

⁵ H. 1. 5. 1; H. 3. 7. 2; C. 5. 17.4.

A Scl Hns Sch-txt; *nisi difficile* G. | *παίδιως* U. | *αἷα* . . . γ' ἐτι U A Scl Hns; *αἷα δὲ καὶ τοῦτο γ' ὥσπερ . . . καὶ ἐτι* Sch e G; γε om. M. | *ὥσπερ ἐλέγομεν* om. G. | *μανότης* corr. Sch (e G: *raritas*); *πυκνότης* U A Scl Hns. | *διατηρῆσαι* U A Hns; *-ρεῖσθαι* Scl.,—*ρεῖν* Sch-txt. | *μανόν* corr Sch; *μᾶλλον* U A Scl Hns. | *αἷα* . . . *μανόν*: *causa eius quoque siccitas est: atque raritas. Quod eis raro laxoque corpore constat infirmius est: quam ut humorem. caloremque seruare diutius possit.* G. (*μᾶλλον* defendit Scl: "τὸ κυριώτερον").

3. *ἔμβια* . . . *βλαστ.*: *conualescere germinareque pollent* G. | καθ. ἐλέχ. om. G. | *τηρεῖ* U, et Hns ante Ms. repertum (cum G: *conseruat*); *τηρεῖν* A Scl. | *ζωτικὴν*: *uitale illud genitaleque* G. | *ὕγρότητά τινα* Scl solus. | *πυκνόν γε εἰ* Wmr

τῆς δάφνης. ἰσχύει γὰρ μᾶλλον, ἢ καὶ δυσώλεθρα τὰ τοιαῦτα· τὸ γὰρ καταλειπόμενον ἀεὶ βλαστητικόν· τῶν δὲ μακρορίζων, διὰ τὴν τῶν ριζῶν ἰσχύν, ὥσπερ ἀπίου καὶ κοκκυμηλέας καὶ ἐτέρων.

(4) τάχα δὲ καθόλου περὶ πάντων ὧδε λεκτέον· πρῶτον μὲν ὅτι μετέωρα καὶ οὐ βαθύρριζα, ἢ εἰ καὶ τινα εἰς βάθος καθιᾶσιν, ἀλλ' ἐνίας καὶ ἐπιπολῆς. ἔπειθ' ὅτι πάντων, ὅταν συρροῆς γενομένης συνθερμανθῇ τοῦτο καὶ πεφθὲν ὑπὸ τοῦ ἡλίου καθάπερ κυῆσαν ἐκτέκη, καὶ ἐκ τῶν ἀκρέμωνων οὕτω καὶ ἐκ τῶν ἄλλων οἱ βλαστοί. τούτων δὲ ὑποκειμένων, κατὰ λόγον ἤδη τὸ παραβλαστάνειν. ἡ γὰρ ρίζα μετέωρος οὔσα καὶ συρροὴν λαμβάνουσα, ταύτην ἐκθερμαίνουσα καὶ πέττουσα μεθίησι τὸν βλαστόν.

(5) τὰ μὲν οὖν πλείστα παρ' αὐτὸ τὸ στέλεχος ἐκβλαστάνει μετεωρόταται γὰρ αὗται· καὶ ἡ γε ἐλάα καὶ ἐκ τῶν πρέμνων. ἄπιος δὲ καὶ ῥόα καὶ ὅσα μὴ μόνον σύνεγγυς, ἀλλὰ διὰ πολλοῦ, μακρόρριζα ὄντα, ἢ ἂν ἡ ρίζα μετέωρος ἦ, ταύτη τὸν βλαστὸν ἀφήλυσιν· ἐνταῦθα γὰρ ἡ συρροὴ καὶ πέψις θερμαινομένης. διὸ καὶ ἄτακτος ὁ τόπος <ὅτι> ἄτακτος ὁ μετεωρισμὸς καὶ ἡ συρροή. τὰ δ' ἄκαρπα καὶ εὐζῶα, καθάπερ αὔγειρος καὶ λεύκη,

(e Sch πυκνὸν εἴ γε); πυκνὸν γε, ἢ A Scl Hns; πυκ. τε ἢ U; ἐὰν πυκ. τε M; *haud enim satis spissitas illa facit: si admodum sicca sit: et ad nepotem* (—um ap. Hns) *procreationem inhabilis*. G. | ἔτι δὲ καὶ Wmr; ἐπεὶ καὶ Scl (sed: "ἐπειδὴ καὶ legendum"); ἐπειδὴ καὶ Sch; ἐπεὶ δὲ καὶ U A Hns; *nam et talis* G. | *πρεμνώδη* A Scl Hns; *τερεμνώδη* U M; *radice detorta: scopulosa: flexuosaque* G. | *πῶς ante καὶ συν. et ἔχειν pro εἶναι* Scl solus. | ἢ καὶ Sch (e mrg-Vsc); ἢ—U A Scl Hns; *Sunt enim robustiora quidem mori hac eadem de causa contumacia* G. | *δυσώλεθρα . . . μακρορίζων* U.

4. μετέωρα: *per summa cespitum haereant* G. | *βαθύριζα ἢ εἰ καὶ τινες* U; *βαθύρρ.* ἢ καὶ εἴ τινα M; β. ἐστι (—νSch) εἰ καὶ—A Hns Sch-txt;—*τινας* A Hns Scl;—*τινα* Sch-txt. | *εἰς βάθος* U A;—*βάθους* Hns. | *ἐπιπολῆς* Scl Hns; *ἐπὶ πολλῆς* U M A. καὶ οὐ βαθ. . . . *ἐπιπολῆς: neque radice alte descendant: aut si qua alte demittant: haec tamen non nullas etiam radices summo tenus agunt.* G. | *ἔπειθ' U.* | *πάντων om. G.* | *ρίζα post πάντων add. Hns;* <ἡ ρίζα> Sch; *radix* G. | *συνθερμανθεῖ* M Scl; *om Hns.* | *τοῦτο fortasse mutandum in τότε cens. Sch-ann.* | *πεφθὲν U* (quod conjecerat Scl); *πεμφθὲν* M A; *πεφθῇ* Sch-txt; καὶ *τοῦτο πεφθὲν* Hns; *excoctaque* G. | *ὑπὸ τοῦ ἡλίου post γενομένης legisse videtur* G,—*confluxu solis.* | *κυῆσαν ἐκτέκη* U A Scl Hns; *κυῆσασα ἐκτίχεται* Sch-txt (cf. <ἡ ρίζα>). | καὶ ἐκ Wmr; καὶ γὰρ ἐκ U A Scl; *κ. γ. ὥς ἐκ* Hns; *κ. γ. <ὥσπερ> ἐκ* Sch-txt; *nam et ramis: et caeteris partibus* G. | *τούτων . . . ὑποκειμ.:* *quae cum ita sint* G (!).

laurel. Such plants are of greater strength⁶ and consequently more enduring, for the part left behind is always inclined to shoot up; and those with long roots⁷ have this ability because of the strength of their roots, as pear, plum, and the rest.

Of all the trees named, perhaps two general statements should be made. First, they are superficial and not deep-rooted; or if they do send some roots deep into the ground, they keep some also on the surface. Second, in all of them, whenever an accumulation⁸ of sap has taken place and the sun has warmed and elaborated it, the root brings forth just as though it were pregnant, and the resultant growths come both from the boughs and from the other parts. Under these circumstances it is reasonable that growth should start right from the root; for the latter, being superficial and getting this accumulation of sap, and warming it thoroughly and elaborating it, sends forth the shoot.

Now the great majority bud out close to the very stalk, for there the roots are nearest the surface of the ground.⁹ The olive, in fact, grows right from the bottom of the trunk. Pear, pomegranate, and all such as have roots not only close to the trunk but also for some distance from it—that is they are long-rooted—send out a bud wherever the root comes near the surface. Sap accumulation and elaboration take place where the root is warmed; accordingly, one cannot predict where this growth may occur since one cannot foretell where the root will approach the surface and where the accumulation of sap will take place. Trees that are sterile¹⁰ and hardy, like the black poplar and

⁶ H. 1. 6. 3; H. 1. 7. 2; contrast H. 3. 6. 4.

⁷ But cf. C. 5. 9. 4.

⁸ H. 6. 6. 8.

⁹ C. 2. 3. 6; C. 4. 7. 3; (danger in this: C. 5. 9. 8; C. 5. 12. 8).

¹⁰ Poplars being dioecious were perhaps thought to be sterile.

5. μετεωρότατα Scl solus. | ἀλλὰ <καὶ> διὰ Sch. | ἡ ἄν corr. Scl (e G); ἡ ὦν ἄν U M A; *quacumque radix persumma sit* G. | <ὅτι> ἀτακτος Mld (e G); ὅτι om. U M A Sch-txt; ἀτακτος δ' ὁ Hns; ἀτ. γὰρ ὁ Sch-txt; *Radix enim qua non sua parte summa telluris petat: confluxumque alimenti capessat: constat nemini.* G. | δύναιται καὶ mrg-Vsc. | ἀκαρπα κ. εὐζωα: *uiuaces ac steriles* G. | βλαστάοντα

καὶ συμπληροῦν δύναται βλαστάνοντα. τὰ δ' ἄλλα οὐχ ὁμοίως, ἀλλ' ἐπὶ τῶν ὑλημάτων καὶ ποιωδῶν ἐνίων τοῦτο συμβαίνει. πρὸς ἃ καὶ δεῖ μεταβῆναι τὸν λόγον· ὑπὲρ γὰρ τῶν δένδρων ἱκανῶς εἴρηται.

IV. Τούτων δὲ τὰς μὲν γενέσεις ἐκ τῶν αὐτῶν θεωρητέον κοινοτάτην πᾶσι τὴν ἀπὸ σπέρματος τιθέντας. οὐ μὴν ἀλλὰ καὶ πλείους εἰσὶ καὶ τούτων, ἧ δὲ ἕκαστα τῶν προειρημένων ἐφάπτεται ταύτῃ διαιρετέον· οἶον καὶ ὑπὲρ ἧς νῦν λέγομεν τῆς ἀπὸ τῶν ριζῶν. ἕνα γὰρ καὶ αὐτόματα βλαστάνει καὶ φυτεύουσιν ἀπὸ τῶν ριζῶν, ὥσπερ τὰ κεφαλόρριζα καὶ ὅλως ὦν παχεῖα καὶ σαρκώδης ἐστὶν ἡ ρίζα. δεῖ δὲ καὶ τὰ μὲν ὑδατῶδες μὴ πλείον ἔχειν ὥσπερ τῆς γογγυλίδος καὶ ραφανίδος· εὐξήραντοι γὰρ αὐταὶ καὶ ἀσθενεῖς εἰς διαμονήν. ἀλλ' ἦτοι χιτῶνας ἔχειν πλείους καὶ ἅμα γλισχρότητά τινα, καθάπερ αἱ τοῦ βολβοῦ καὶ σκίλλης καὶ ὅλως εὐχυλόν τινα καὶ εὐσαρκον εἶναι, καθάπερ αἱ τοῦ ἀμαράκου τοῦ χλωροῦ καὶ τοῦ λειρίου καὶ τῶν ὁμοειδῶν. (2) αἱ γὰρ τοιαῦτα φυτεῖαν μόνον δέχονται καὶ μέταρσιν. καὶ τούτων αἱ μὲν καὶ πλείω χρόνον διαμένουσιν, αἱ δὲ ἐλάττω κατὰ τὰς ἰδίας φύσεις ἐκάστων. ἄλλαι δ' αὖ πάλιν εἰσὶ τινες

conj. Wmr (e Sch); βλαστάνειν U A; τὸ β' εἰν Scl ("i. e. τὸ βλαστανόμενον"). | συμπληροῦν . . . συμβαίνει: *facile possunt. quod quidem nulli ex reliquis pariter datum est: quamquam in herbis quibusdam: atque submisso genere ita fieri certum est.* G. | δὴ μεταβῆναι U M.

1. τῶν αὐτῶν: *atque superiorum* add. G. | ἧ δὲ corr. Scl (e G: *qua uero ratione*); ἡ U; εἰ A Hns. | ταύτη(?) U (fortasse *ταύτην*, ult. *duae litt. fere oblitae*); cf. G: *eam . . . diuidere decet* (ταύτην?). | διαιρετέον U (in—τέον post mutatum). | οἶον καὶ U; καὶ om. A Hns Sch-txt. | ὑδατῶδες U M A; ὑμενῶδες Hns. | δεῖ δὲ . . . ἔχειν: *Sed nulla et tenui et diluto cortice integretur . . . opus est.* G, unde susp. Sch-ann: *φοιῶδες καὶ ὑδ.* fortasse *legendum esse.* | μὴ πλείον conj. Wmr; *μηδεμίαν* U A Scl Hns Sch. | ἀσθενεῖς εἰς: *ασθενεῖς* U (ss *super v scriptis*). | ἀλλ' ἦτοι: ἀλλὰ δεῖ conj. Sch. | αἱ τοῦ U M; καὶ τοῦ A Hns. | <τῆς> σκύλλης Sch de suo et solus. | ἀμαρ. τοῦ χλωρ.: *aracum recens* G.

2. φυτεῖαν A; *φοιτεῖαν* M (et forte U, sed in U inter φ et τ rasura ubi v repostum); *seri . . . posse* G. | ἐλάττω. καὶ τὰς ἰδ. φύσ. ἐκάστω M; (unde Sch: ἐκάστων, pro ἐκάστου A Hns); κατὰ τὰς ἰδίας* φύσεις U (*ἐκάστω in margine); *pro sua quaeque natura* (sc. *aliae durant*) G. | ἀφιδᾶσιν U. | μεταρόμεναι A. | δ' οὐ U A Hns; δὲ οὐ Sch Wmr. | ἐπ' ἐκείνων Wmr; ἐπὶ τινων U A Hns; ἐπὶ τῶν ἄλλων Sch e mrg-Vsc; ἐπὶ τινων <ἄλλων> fortasse *scribendum*; *quam in caeteris* G. | ἔστι δὲ U A Scl; ἐπὶ δὲ Hns; ἔτι δὲ Sch-txt. | -δος καὶ ἀπὸ . . . ἀπὸ παρασπά habet in mrg. U a primo scriptore addita. | *φυτεῖα* Sch cum Mld; *φύεται* U A

the white poplar,¹¹ can even fill their vicinity with shoots.¹² This phenomenon does not occur in the same fashion in other plants except certain shrubs¹³ and herbs. We must now proceed to the study of these latter, since enough has been said about trees.

IV

The origins of these shrubby and herbaceous plants we must study from the same points of view, premising that all have growth from seed as their most common method. These plants, however, have in addition several other methods of growth—beginning; and each method must be distinguished in its connection with our previous discussion, for instance, growth from the root, of which we are now going to speak. For some spring forth of their own accord from the roots and are then transplanted, for example, the bulbous-rooted¹ plants and in general those whose roots are thick and fleshy. None of these must contain too much of the watery element as do turnip and radish, for the roots of these plants dry up readily and are weak in lasting qualities; or else the roots must have more scale leaves² and at the same time a certain mucilaginous quality³ as do purse-tassels⁴ and squill,⁵ and they must in general be succulent and fleshy, like green-marjoram,⁶ lily,⁷ and those of like appearance; for only such roots permit planting and transplanting.

Of these, some last a longer, some a shorter time, depending on the nature of each. Again there are certain others which, if

¹¹ In the Academy Garden; cf. *Ar. Nub.* 1007.

¹² *C.* 1. 5. 4 end.

¹³ Defined in *H.* 1. 5. 3.

¹ *H.* 7. 12. 1; *H.* 7. 13. 4; *C.* 1. 8. 1; *C.* 6. 12. 1.

² *H.* 1. 6. 7.

³ Bailey, 3116: The scales of the bulb of *Urginea Scilla* contain mucilage, etc.

⁴ *H.* 7. 2. 1, 2; *C.* 4. 6. 1.

⁵ *H.* 7. 13. 4.

⁶ *H.* 6. 7. 4.

⁷ *H.* 6. 6. 9.

αἱ μένουσαι μὲν ἐν ταῖς ἐαυτῶν χώραις ἀφ' ἑαυτῶν βλαστὸν οἶον αἱ τῶν ἐπετει-
οκαύλων, μεταιρόμεναι δ' οὐ δύνανται διὰ τὴν ξηρότητα. τὴν γὰρ αὐτὴν
αἰτίαν ὑποληπτέον καὶ ἐπὶ τούτων, ἥνπερ ἐπ' ἐκείνων.

Ἔστι δὲ τινῶν καὶ ἀπὸ παρασπάδος καὶ ἀπὸ τῶν ἄκρων φυτεία καὶ
γένεσις. ἀπὸ παρασπάδος μὲν καὶ ραφάνου καὶ πηγάνου, τῶν δὲ στε-
φανωτικῶν οἶον ἀβροτόνου καὶ σισυμβρίου καὶ ἐρπύλλου· καὶ ἀπὸ τῶν
ἄκρων δ' ἐνίων τῶν αὐτῶν, πηγάνου τε καὶ ἀβροτόνου καὶ τῶν στεφανωτικῶν
(3) καὶ γὰρ ἔχει ταῦτά γε καὶ καθίησιν εὐθὺς ρίζας ἐκ τῶν βλαστῶν ὥσπερ
ὁ κιττός· οὗτος γὰρ δὴ μάλισθ' ὅλως ἔμβιος καὶ εἰσδύμενος εἰς αὐτὰ τὰ
δένδρα καὶ ἐν τῇ γῇ κρυπτόμενος. τῶν δὲ λαχανωδῶν τὸ ὠκιμον· καὶ γὰρ
τὰς ἀποφυτείας ἐκ τῶν ἄνω δέχεται, καίπερ ξυλῶδες ὄν, ἀλλ' ὅτι δυσξήραντόν
ἐστι ταύτῃ φύεται. διὸ καὶ πολὺν χρόνον διαμένει καὶ κολουόμενον πάλιν
βλαστάνει. ξυλῶδες δὲ καὶ τὸ ἀβρότονον, ἀλλ' ἔχει τινὰ τῇ πυκνότητι
καὶ δριμύτητι φυλακὴν ὥσπερ ὁ κιττός· καὶ γὰρ οὗτος φύεται καταπη-
γνύμενος.

(4) αὗται μὲν οὖν κοιναὶ πλείονων, αἱ δὲ τοιαῦται καὶ σπάνιαι καὶ ἐλάττους
ὥσπερ τῆς κρινωνίας καὶ ῥοδωνίας. καὶ ὁ κάλαμος ὁ σχισθεὶς φύεται
καὶ βλαστάνει. ταῦτα δὲ ὅμοια καὶ παραπλήσια καὶ τὰ τῆς ἐλάας καὶ εἰ

Hns; φύσις conj. Dlc; φύεται καὶ delend. cens. Scl; *generatio . . . fieri potest* G. |
καὶ ραφάνου U M; καὶ om. A. | στεφανωτικῶν U M. | σισυμβρίον (mend.) A. |
ἐρπύλλου Wmr; ἐρπύλου U A Hns Sch. | καὶ ἀπὸ U A; καὶ om. Sch-txt. | τῶν
ἄκρων Sch cum mrg-Vsc; τῶν ἄλλων U A Hns. | δὲ ἐνίων Sch; ἐνίων U A Hns. |
τῶν αὐτῶν . . . στεφανωτικῶν ut repetita delend. cens Scl; post ἐρπύλλου
omnia om. G.

3. ἔχει ταῦτά γε καὶ om G. | οὗτος γὰρ: *Illa tamen (pro enim) G.* | ὅλος Sch-
txt. | ἔμβιος U et legend. cens. Scl. (vel εὐβιος sicut εὐζων); ἔμβριος M; ἔμβριος
A Hns Sch-txt; *omnium maxime viuius est* G. | κρυπτόμενος U A; κείμενος maluit
Dlc; ριπτόμενος mrg-Vsc; κατακοπτόμενος conj. Sch, qui autem totum mem-
brum susp. | καὶ εἰσδυομ. . . . κρυπτομ.: *sive arbores scandens amplexu suo
perstringat: seu in terra abdita ima subeat* G (plenius, ut solet). | τὰς ἀποφυτείας
Sch cum Bcr et mrg-Vsc; τοὺς ἀπὸ φυτείας U A Hns; βλαστοὺς add. Scl e
conject. | καὶ γὰρ . . . δέχεται: *hoc est enim (etenim ap. Hns) seri pro parte
superna optime potest.* G. | ἀλλ' ὅτι Sch c. Bcr et mrg-Vsc; ἔτι U A Hns; ἔτι
καὶ Scl; *sed quam (si quid ap. Hns—pro εἰ τι?) difficilius exicarrī possit: ea
prouenit.* G. | βλαστάνειν U. | κολουόμενον: *tonsum et diminutum* G. | ξυλῶδες
(mend.) . . . καὶ ἀβρότονον Hns. | ἔχει τινὰ . . . φυλακὴν: *seruari aliquantulum
temporis potest* G. | δριμύτητι: *acore* G. | καὶ γὰρ οὗτος U; καὶ οὗτος M; καὶ οὕτω
A Hns; καὶ οὗτος γὰρ Sch-txt (ante Ms. repertum) e G; *nam haec . . . quoque.*

they remain in their own places, send out a bud, such as those plants that have an annual stalk;⁸ but if they are transplanted, they cannot do this, because of their dryness. The same explanation is to be offered for these as for the former. Some, too, have their planting and growth either from a torn-off branch or from a growing tip. Of the first sort, from a torn-off branch, we might mention both cabbage and rue,⁹ and also coronary plants¹⁰ such as artemisia, bergamot-mint, and tufted thyme; of the second sort, from growing tips,¹¹ we might mention some of the same—rue and artemisia and the coronaries.

Now it is a fact that these, at any rate, also have roots which they send forth right from the buds as does ivy.¹² For this is a most extremely hardy plant whether growing up and rooting on the very trees or growing along the ground hidden by other vegetation. Now in garden herbs this is true of basil, which, though it be woody, permits of planting from its upper parts; but, because it is not easily dried out, it is thus propagated and so endures for a long while and when cut back grows again. Artemisia¹³ is also woody; but in its denseness and acridness¹⁴ it has a certain protection, just as does ivy which, in fact, puts forth shoots when firmly stuck into the ground. These then are the methods of propagation common to most plants.

The following methods of propagation¹⁵ are not common to many plants, but in lilies¹⁶ and roses the cane, when split, will

⁸ *E. g.* dahlia, tulip, crocus?

⁹ H. 7. 2. 1, 4; H. 7. 5. 3.

¹⁰ H. 6. 6. 9.

¹¹ H. 2. 1. 3.

¹² H. 3. 18. 6–10.

¹³ H. 6. 7. 3.

¹⁴ C. 6. 12. 2; Scaliger says that this quality is an instance of "warmth." See Arist. G. A. 3: 11 (761b).

¹⁵ Schneider suspects a lacuna.

¹⁶ For *krinon*, see *Lilium candidum* in *Enc. Brit.* 16: 687 c; Plin. N. H. 21: 24, 25 (11–12).

4. κρινωντας: lilii G. | ρωδωντας U. | ροδωντας. και δ κάλαμος U A Hns Sch; ροδωντας και δ καυλός δ σχ. Wmr. | και δ κ. δ σχισ.: <τῶν καυλῶν κατακοπέντων> και δ κάλαμος δ σχισ. Sch-txt; *Illae uero quum pauliores sunt: tum raro eueniunt: uidelicet lilii: atque rosae. Ad haec harundo perfissa stirpe enasci:*

τι ἄλλο βλαστητικὸν ἀπὸ τοῦ ξύλου. διὸ καὶ ὑπὸ τὴν <αὐτὴν> αἰτίαν πίπτει· δύναται γὰρ διατηρεῖν τὴν ὑγρότητα καὶ θερμότητα τὴν γόνιμον. καὶ τό τε κατακόπτειν καὶ κατασχίζειν εὐλογον. ἐκ γὰρ τοῦ ἐλάττονος καὶ ἀνωγμένου θάττον ἢ ἀρχὴ καὶ εὐκολωτέρα· τὸ δὲ μέγα καὶ συμπεπ-
τωκὸς οὐχ ὁμοίως παθητικὸν οὐδὲ βλαστητικόν.

(5) διὸ καὶ τὰ σκόρδα διαιροῦσιν εἰς τὰς γέλγεις καὶ τῶν κρομμύων ἀφαιροῦ-
σι τὰς τε ῥίζας τὰς κάτω καὶ τὰ κελύφη. ταῦτα γὰρ παρέχει πᾶν τὸ
ἀλλότριον· ἀλλότριον δὲ τῷ ζῶντι τὸ μὴ ζῶν· ὥσπερ καὶ τῶν δένδρων
τὰ ἀφαναινόμενα. τῆς μὲν οὖν ἐλάας καὶ τῶν μυρρίνων οὐ δεῖ περιαιρεῖν
τὸν φλοιόν, ἀποστέγει γὰρ καὶ τηρεῖ τὴν ζωὴν· τῶν δὲ κρομμύων καὶ
σκόρδων δεῖ, δεῖ δὲ μὴ τοὺς ζῶντας μηδὲ τοὺς κυρίους ἀφαιρεῖν· ἐπεὶ κἀκείνων
εἴ τις ἀφαιροίῃ τούτους <οὐ> βλαστάνει.

(6) ἰδιωτάτῃ δὲ βλάστησις ἢ ἐκ τῶν δακρύων, οἷον τοῦ θ' ἵπποσελίνου
καὶ τοῦ κρίνου καὶ ἐνίων ἐτέρων. οὐκ ἄλογος δὲ ἀλλ' ὁμολογουμένη τῇ
ἐκ τῶν καυλῶν. οὐδὲν γὰρ ἕτερον ἀλλ' ἢ ξυνηθροισμένην δεῖ εἶναι καὶ
ἐν ἐκείνοις ἀρχὴν τὴν γόνιμον· οὐ γὰρ ἄνευ θερμότητος ἢ τοιαύτης καὶ

germinarique potest. G. | ταῦτα δὲ ὅμοια κτλ.: *proxima iis olea* (quasi ταῦταις,
κτλ.) G. | <αὐτὴν> add. Sch; *Quapropter eadem causa reddit.* G. | πίπτει. δύναται
γὰρ corr. Wmr; πίπτει· ὅτι καὶ δύναται Sch c. Bcr; πίπτειν δύναται. καὶ U
A Hns; *quod ea quoque suum humorem caloremque foecundum servare utique
possunt.* G. | καὶ τό τε Sch Wmr; καὶ τότε A Scl Hns (τό/τε U); *nec procul
argumento praecidi solent.* G. | ἀνωγμένων M. | θάττον U (et corr. Scl, unde
Hns); θάττων A Sch-txt; *celerius . . . initium* G. | εὐκολωτέρα . . . συμπεπτοκὸς U.

5. σκόρδα U ("ubique" Sch); σκόρδα A Scl Hns Sch-txt. | κρομμύων U A
Scl Hns (cf. L. & S.); κρομμύων Wmr. | τὰς τε U M; τε om. A Hns; *caeparum
fibras tegumentaue detrahunt* G. | ταῦτα γὰρ παρέχει U A Hns Scl; τὰ αὖτα
παραيروῦσι καὶ conj. Sch-txt. | alterum ἀλλότριον om. U; ἀλότριον A. | τῷ ζῶντι U;
τῶν ζωτικῶν A Scl Hns Sch-txt; *denique omne non uiuum: a uitalibus semouen-
dum censent.* G (quasi: τελευταῖον ἀπαλάττεσθαι δὲ τῶν ζωτικῶν πᾶν τὸ μὴ ζῶν). |
ἀφανηνόμενα U M; *quae (sc. partes) obarescunt abscindere assolent* G. | μυρρίνων
M. | οὐ δεῖ A; οὐδὲ U M; *corticem detrahendum nequaquam existimant.* G. | τηρεῖ
ζωὴν M; *arboris uitam* G. | δεῖ, δεῖ δὲ Wmr; δεῖ διὰ τὸ U A Hns; δεῖ τοὺς
χιτῶνας Sch-txt; *At caeparum alleorumque tunicas eximunt: quoniam istae
(neque uiuunt add. Hns.) neque primatum causae obtinent.* G. | ἀφαιροίῃ τούτους
βλαστάνειν U M; ἀφαιρεῖν κτλ. A; βλαστάνει corr. Scl; τούτους om. Hns qui
<οὐ> e G inseruit; οὐ om. U M A; *germen nullum poterit mitti.* G.

6. ἰδιωτάτῃ U. | ἵπποσελίνου A; *equa pii* G. | ἄλογον . . . ὁμολογούμενον Hns;
ὁμολογουμένη U. | ἀλλ' ἢ A; ἀλλ' εἰ U; *nihil . . . aliud quam* G. | ξυνηθροισμένην U;
μένοις A Scl; -μμένως Hns. | ἐν ἐκείνοις Wmr; τὴν ἐκείνων Sch-txt; τὴν ἐκείθεν

grow and bud forth.¹⁷ The same or a very similar thing is true of olive and of whatever plants can shoot forth from the wood; and so these latter fall under the same explanation, being able to preserve their innate moisture and warmth. Now their being cut off and split is also reasonable; for from a smaller and more open part growth can more rapidly and more easily begin. What is large and compact is not so readily induced to germinate.

Wherefore the general practice¹⁸ is to separate the cloves of garlic and to remove from onions their lower roots and shell-like outer layers;¹⁹ for these parts contain all that impedes germination in as much as all that is lifeless is opposed to that which is alive, as for example the dried-up parts²⁰ of trees. Now of olive and myrtle²¹ the bark must not be stripped off, for it protects and preserves the life. It is to be removed, however, from onions and garlicks; but one must not take away the living and essential layers, since in these plants also, if one removed those parts, there would be no growth.

Most peculiar is growth from gummy exudations²² as in alexanders and *krinon* (lily) and some others. This however is not unreasonable, but is consistent with growth from stalks; for it needs no other explanation than the bringing together into one place of the generative principle in them also. Such a principle cannot exist without warmth and moisture. But the

¹⁷ This whole section must be taken in very close connection with H. 2. 2. 1, to the substance of which it unquestionably refers. Cf. H. 6. 6. 6, 8, 9; C. 5. 16. 4. (In H. 8. 3, 2. *κάλαμος* is identified with *καυλός*.)

¹⁸ H. 7. 4. 7-11.

¹⁹ I. e. including the dried leaves that are hung away with them in the winter.

²⁰ The eff. te sap wood, "soft wood"; cf. H. 2. 7. 3; H. 3. 17. 1.

²¹ H. 2. 7. 2.

²² Probably *callus* (see Webster, s. v.); cf. H. 7. 6. 3.; H. 9. 1. 4; H. 6. 6. 8; C. 1. 6. 9. Plin. *N. H.* 21: 24, 25 (11-12).

U A Scl Hns; *quod illarum quoque foecundum principium coactum esse oportet*. G. | ἡ τοιαύτη καὶ ὑγρότητος Wmr (partim e Sch-ann); τοιαύτη κ. ὑγρότης U M; καὶ om. A Hns; θερμότητος κ. ὑγρότητος ἡ τοιαύτη <γένεσις> Sch,—postrema vox e G et Scl; *non enim sine calore humoreque generatio talis consequitur*. G. | γενητικά A Hns; *generandi uim obtinent* G. | ἀνακτέον Wmr (e Sch-auct);

ὕγρότητος. ὅτι δ' οὐ πάντων οἱ ὅποι καὶ τὰ δάκρυα γεννητικά, πρὸς τὰς ἐπάνω καὶ προτέρας αἰτίας ἀνακτέον. ὅτι δ' οὐδ' οἱ καυλοὶ οὐδ' αἱ ῥίζαι, κατὰ λόγον δὲ καὶ τοῦτ' ἐστίν, ὅπερ ἐλέχθη πρότερον, ὅτι πλείους αἱ γενέσεις καὶ τῶν ἄλλων ἢ τῶν ἄλλων ῥάδιον γεννῆσαι τὰ ἀτελέστερα καὶ ἀπ' ἐλάττονος ἀρχῆς. αἱ μὲν οὖν ἐκ τῶν μορίων ὅποιαι, καὶ διὰ τίνας αἰτίας, ἐκ τούτων θεωρεῖσθω. καὶ γὰρ εἴ τι παραλέλειπται, προσθεῖναι καὶ συνιδεῖν οὐ χαλεπόν.

V. Αἱ δ' αὐτόματοι γίνονται μὲν ὡς ἀπλῶς εἰπεῖν τῶν ἐλαττόνων καὶ μάλιστα τῶν ἐπετειῶν καὶ ποιωδῶν· οὐ μὴν ἀλλὰ καὶ τῶν μειζόνων ἔστιν ὅτε συμβαίνουσιν ὅταν ἢ ἐπομβρίαὶ κατὰσχωσιν ἢ ἄλλη τις ἰδιότης γένηται περὶ τὸν ἀέρα καὶ τὴν γῆν. οὕτω γὰρ καὶ τὸ σίλφιον ἀνατεῖλαι φασιν ἐν Διβὴν πιττωδούς τινὸς ὕδατος γενομένου καὶ πάχεος, καὶ τὴν ὕλην δὲ τὴν νῦν οὖσαν ἐξ ἐτέρας τινὸς τοιαύτης αἰτίας· οὐ γὰρ ἦν πρότερον. (2) αἱ δ' ἐπομβρίαὶ καὶ σήψεις τινὰς ποιοῦσι καὶ ἀλλοιώσεις, ἐπὶ πολὺ διΐκνουμένου τοῦ ὑγροῦ, καὶ τρέφειν καὶ ἐπαύξειν δύνανται τὰ συνιστάμενα, θερμαίνοντος τοῦ ἡλίου καὶ καταξηραίνοντος, ὥσπερ καὶ τὴν τῶν ζώων γένεσιν οἱ πολλοὶ ποιοῦσιν· εἰ δὲ δὴ καὶ ὁ ἀήρ σπέρματα δίδωσι συγκαταφέρων ὥσπερ φησὶν Ἀναξαγόρας καὶ πολλῶ μᾶλλον· ἄλλας γὰρ ἂν ποιοῖεν ἀρχὰς καὶ τροφάς.

ἀνεκτέον U (in ἀνακτ. correctum) M; ἀνεκτέον A Scl Hns Sch-txt; *reduci par est* G. | τοῦτ' ἔστιν post ἀνεκτ. add. Hns. | ὅτι δ' οὐδ' οἱ U M A Hns; δ' om. Sch-txt (e Scl); ὅτι δ' οἱ A-Bas; ("lego ὅτι οὐδ' οἱ, non autem ὅτι δ' οἱ" Scl 14. 2. C.); *idest quod neque caules neque radices uim eiusmodi sortiantur* G; *ἐτι δ' οὐδ'* Keil ap. Hindenlang, p. 85. | καὶ τοῦτ' Wmr; κ. τοῦτο U A Scl Hns. | αἱ γενέσεις U. | ἢ τῶν ἄλλων U M A; om. G Hns Sch-txt. | ῥάδιον Hns; ῥάδειον U; ῥᾶον Sch. | ἀτελέστερα . . . ἀρχῆς: post haec verba, lacunam susp. Sch. | κατὰ λόγον . . . ἀρχῆς: *nec non et quod ante rettulimus: plures etiam caeterorum esse generationes: ratione non uacat: quippe cum ea facilius atque ex minori principio: ualeant generari: quae imperfectiora sunt.* G. | μορίων <γενέσεις> Sch-txt. | προσθεῖναι (in-εἶναι corr.) U. | συνιδεῖν κτλ.: *concernique ab aliis facile* G.

1. ἀπλως om. Hns; *simpliciter* G. | ἄλλη τις ἰδιότης A Hns Sch-txt; ἄλλη τις ἰδιότης τίς U; ἄλλη ἰδιότης τις Wmr; *proprietas aliqua* G. | οὕτω γὰρ τὸ Hns. | γενομένου U M; γινου. A Hns. | πάχεος U Wmr; παχέος A Hns Sch.

2. σίψεις U. | ἀλλοιώσεις: *mutationesque humi* G. | ἐπὶ πολὺ U (Sch: "ubique"; sed primus accentus manu recentiore additus mihi videtur) Scl; ἐπιπολὺ A Hns Sch-txt. | δικνουμένου Scl; *quum alte humor descenderit* G. | δύνανται ante τρέφ. legisse videtur Scl. | πολλῶ μᾶλλον U; *longe magis sic facitetur necesse est.* G (plenius). | ἂν ποιοῖεν A Hns; — ποεῖεν U Scl; — ποιεῖ M; ἂν omisisse videtur

fact that the saps and gums of all plants are not reproductive must be referred to the reasons given before, earlier in our study. That stalks and roots are not always germinative is also reasonable, as was said above, because²³ the other parts involve more methods of propagation, or because it is easier for the more immature parts of the others to grow and that too from a small beginning.²⁴ As to the nature of the means of propagation from the various parts, and for what reasons they come from these parts, let this study suffice; for if anything has been omitted, anyone can supply it in his own mind.

V

Spontaneous generation, to put the matter simply, takes place in smaller plants, especially in those that are annuals and herbaceous. But still it occasionally occurs too in larger plants whenever there is rainy weather or some peculiar condition of air or soil; for thus it is said that the silphium¹ sprang up in Libya when a murky and heavy sort² of wet weather condition occurred, and that the timber growth which is now there has come from some similar reason or other; for it was not there in former times.

The rains also produce certain decompositions and changes—when the moisture penetrates deeply—and they can nourish and increase the resulting growths under the warming and drying influence of the sun. Many believe that animals³ also come into being in the same way.

But if, in truth, the air also supplies seeds, picking them up

²³ Hindenlang, pp. 84 f., would read "that" (indirect statement), and he would break the sentence in a different manner; but even his arrangement seems to me to require "because" at this point.

²⁴ Or, from a small store of the vital principle.

¹ Probably *Ferula tingitana*; cf. H. 6. Chap. 3.

² Lit. pitchy and thick. Cf. H. 3. 1. 6; Plin. *N. H.* 16: 143 (61) = A.U.C. 430; Plin. *N. H.* 19: 41 (15) = A.U.C. 143.

³ Cf. e. g., Arist. *H. A.* 6: 16 (570 a) on eels.

ἔτι δ' οἱ ποταμοὶ καὶ αἱ συρροαὶ καὶ ἐκρήγματα τῶν ὑδάτων πολλαχόθεν ἐπάγουσι σπέρματα καὶ δένδρων καὶ ὑλημάτων, διὸ καὶ αἱ μεταστάσεις τῶν ποταμῶν πολλοὺς τόπους ποιοῦσιν ὑλώδεις τοὺς πρότερον ἀνύλους. (3) ἀλλ' αὐταὶ μὲν οὐκ αὐτόματοι δόξαιεν ἂν, ἀλλ' ὥσπερ σπειρόμεναί τινες ἢ φυτευόμεναι. τὸ δὲ τῶν ἀκάρπων οἰηθεῖη τις ἂν μᾶλλον αὐτομάτους εἶναι, μῆτε φυτευομένων μῆτε ἀπὸ σπέρματος γινομένων, ὅπερ ἀναγκαῖον <εἶ> μὴδ' ἕτερον τούτων.

ἀλλὰ μὴ ποτ' οὐκ ἦ τοῦτ' ἀληθές ἐπὶ γε τῶν μειζόνων, ἀλλὰ μᾶλλον λανθάνουσιν αἱ πᾶσαι τῶν σπερμάτων φύσεις· ὅπερ καὶ ἐν ταῖς ἱστορίαις ἐλέχθη περὶ τε τῆς ἰτέας καὶ τῆς πτελέας. ἐπεὶ καὶ τῶν ἐλαττόνων πολλὰ διαλανθάνουσι τῶν ποιωδῶν, ὥσπερ καὶ περὶ τοῦ θύμου καὶ ἐτέρων ὧν εἶπομεν ὡς κατὰ μὲν τὴν ὄψιν οὐ φανερά, κατὰ δὲ τὴν δύναμιν φανερά· σπειρομένων γὰρ τῶν ἀνθῶν γεννᾶται.

(4) καὶ δυσόρατα καὶ μικρὰ καὶ τῶν δένδρων ἓνα σπέρματα τυγχάνει καθάπερ καὶ τῆς κυπαρίττου. ταύτης γὰρ οὐχ ὅλος ὁ καρπὸς <δ> σφαιροείδης ἐστίν, ἀλλὰ τὸ ἐγγινόμενον ἐν τούτῳ λεπτὸν καὶ ὥσπερ πιτυρῶδες καὶ ἀμενῆνον ὅπερ ἐκπέτεται διασχασκόντων τῶν σφαιρίων,

Scl; οὐκ ἂν ποιοῖεν Dlc; *nimirum addicī possunt* G. | εἰ τι δ' οἱ . . . ἐκρήματα M; . . . *praeruptiones* G. | ἐπάγουσι σπέρματα corr. Sch (e G) cum Bcr et Dlc; ἐπάγουσαι σπερμάτων U A Scl Hns; *semina . . . aduehunt* G. | ὑλώδης U (in-eis manus rec. mutavit). | ἀνήλους A-Bas; *quae sylva prius omnino uacabant.* G.

3. ἢ φυτευόμενα U A Hns Sch; καὶ φντ. Wmr (fortasse e G); *sed uelutī semine: atque planta: potius generari.* G. | ἀκάρπων corr. Scl e G; καρπῶν U A Hns; *sterilia uero sponte potius creari putaueris* G. | αὐτομάτους U M; -τον A Hns Sch-txt. | ὅπερ ἀναγκαῖον U M; ὅπερ δὴ ἂν. A Scl Hns. | <εἶ> μὴδ' ἕτερον Sch; εἰ om. U M A Scl Hns. | ὅπερ . . . τούτων om. G. | οὐκ ἦ Sch; —ἦν U M A Scl Hns. | αἱ πᾶσαι om. G. | ἐλαττόνων πολλὰ U A Hns; —πολλὰ (ad σπέρματα referens) Sch. | διαλανθ. corr. Scl (e G) et habet U; διαλαμβάνουσι A Hns; *non desunt herbae quarum natura facile oblirescat:* G. | ἐτέρων εἶπομεν ὡς corr. Sch; ἐτ. ὡς εἶπ. A Hns; ἐτ. ὧν εἶπ. U M; *reliquorum quae subiunximus* G. | γεννᾶται: *thymum . . . nascitur* G.

4. γεννᾶται. καὶ . . . μικρὰ καὶ Dlc et Mld e G; γεννᾶται καὶ . . . μικρά. καὶ U A Scl Hns; *nascitur: et arborum quoque quarundam semina paruula uixque uisu percipienda sunt.* G. | <δ> σφαιρ. Scl; δ om. U M A Hns; (σφαιροείδης Wmr); *non id totum est quod pilae speciem gerit.* G. | πιτυρῶδες corr. Scl; πιτυῶδες U M A G (quasi *laricis semini proximum*). | ὅπερ corr. Sch; ἄπερ U A Hns. | ἐκπέτεται conjectura in mrg-Vsc; *dehiscence dilabitur* G. | σφαιρίων Sch; σφαιρῶν U A Hr■

and carrying them about, as Anaxagoras⁴ says, then this fact is much more likely to be the explanation; for it would produce other examples of beginnings and nourishings. Moreover the rivers and the gathering together and breaking forth abroad of waters⁵ purvey seed from everywhere, both of trees and shrubby plants; wherefore also changes in the courses of rivers make many places wooded that before were woodless.

Such growths would not appear spontaneous, but rather as though sown or planted. Of the sterile sorts, one might the rather expect growth of their own accord, as they are neither planted nor grown from seed. If, however, they come from neither of these latter processes, then their origin must be spontaneous. But this may possibly not be true, at least for a good many of them; it may rather be that all the stages of development of their seeds escape our observation, just as was said in *Historia* about willow and elm.⁶ Moreover the development of seed is hidden also in many of the smaller herbaceous plants, as we said, about thyme and the others, that they were not apparent to the sight, but that their power was evident, since the flowers when sown propagate the plants.⁷

It happens, also, that the seeds of some trees are small and hard to see, for instance those of cypress. For it is not the entire globular fruit of this tree that is the seed, but the light and, as it were, bran-like slight object which grows in the midst of the fruit, and which flutters away when the fruit breaks open; and so it requires some experienced person to collect it, one who can observe narrowly the time of maturity of the fruit and who can recognize the seed itself.

This happens to be true of many other trees, especially in all such as grow close together in natural forests and on the mountains. For one might not easily suppose that this densely crowded condition of growth would persist as a result of their

⁴ H. 3. 1. 4; Varro R. R. 1. 40. 1.

⁵ Floods, especially those from melting snows, etc., in springtime; cf. H. 3. 1. 5.

⁶ See Sir William Thiselton-Dyer's Index of Plants in Hort., ed. H. P., vol. II, pp. 453 and 472; H. 3. 1. 2, 3.

⁷ H. 6. 2. 3.

διὸ καὶ ἐμπείρου τινὸς ἐστὶ συλλέξει τήν θ' ὥραν παρατηρεῖν αὐτό <τε> τὸ σπέρμα γνωρίζειν δυναμένου. ἐπὶ πολλῶν μὲν οὖν καὶ τοῦτο συμβαίνει καὶ μάλιστα ὅσα συνεχῇ ἐν ταῖς ὕλαις ταῖς ἀγρίαις καὶ τοῖς ὄρεσιν ἐστίν· οὐ γὰρ ῥᾷδιον αὐτομάτως συνισταμένων διαμένειν τὸ συνεχές, ἀλλὰ δυοῖν θάτερον, ἢ ἀπὸ ῥίξης ἢ ἀπὸ σπέρματος βλαστάνει.

(5) ὀλίγα δ' ἄκαρπα τῶν ὁμογενῶν οἱ ὑλοτόμοι φασὶν εἶναι. ταῦτα ἤτοι λανθάνειν εἰκὸς ἢ διὰ τὸ καταναλίσκειν εἰς τὰ ἄλλα τὴν τροφήν ἄκαρπα γίνεσθαι, καθάπερ τὰς ἀμπέλους τὰς τραγώσας καὶ ὅσοις ἄλλοις τοῦτο συμβαίνει. γινόμενον δ' ἐπὶ τῶν καρπύμων καὶ ἀνθοφόρων, τί κωλύει τοῦτο συμβαίνειν ἐπὶ τῶν ἄλλων ὥσπερ πηρουμένων πρὸς καρπογονίαν; ἀλλὰ τοῦτο μὲν ὡς ἐπιδοξαζόμενον εἰρήσθω, δεῖ δὲ ἀκριβέστερον ὑπὲρ αὐτοῦ σκέψασθαι καὶ ἀνιστορήσαι τὰς αὐτομάτους γενέσεις. ὥς δὲ ἀπλῶς εἰπεῖν, ἀναγκαῖον γίνεσθαι διαθερμαινομένης τῆς γῆς καὶ ἄλλοιουμένης τῆς ἀθροισθείσης μίξεως ὑπὸ τοῦ ἡλίου, καθάπερ ὀρώμεν καὶ τὰς τῶν ζώων.

VI. Λοιπὸν δ' εἰπεῖν ὑπὲρ τῶν ἐν ἄλλοις γενέσεων οἷον τῶν κατὰ τὰς ἐμφυτείας καὶ τοὺς ἐνοφθαλμισμοὺς. ἀπλοῦς δὲ τις λόγος καὶ σχεδὸν

(et διαχασκουσῶν Hfm ap. Sch); *pilula* G. | διὸ καὶ A Scl Hns; δι' οὐ καὶ U; διὸ ἢ καὶ M. | τήν θ' ὥραν cum Mld Sch; τήν θεωρίαν A Scl Hns (nescio an recte; cf. θεωρίαν, termum technicum ap. Arist.); τῇ θεωρίᾳ U. | παρατηρεῖν Sch cum Mld; ῶν U M A Hns; -ροῦντος conj. Scl. | αὐτό <τε> τὸ Wmr; αὐτὸ τὸ U M A; <καὶ> αὐτὸ τὸ Scl Sch-txt; τε αὐτὸ τὸ Hns. | σπέρμα καὶ γν. Hns solus. | δυναμένου Hns; -μενον U M A. τήν θ. . . . δυναμ. om. G (et legi proinde non nisi ab experto homine potest). | μὲν οὖν τοῦτο Sch. | συνεχῇ Sch (e G: *praecipue in his: quae continua in . . . exeant*); συνεχῶς U M A Scl ("ut ait potius *συχνῶς*") Hns. | θάττερον U ("ubique" Sch). | βλαστάνει Wmr; -νειν U A Hns Sch.

5. ὀλίγα δὲ U A Scl Hns. | οὐχ ὁμοιογενῶν post ὁμογενῶν add. U solus. | ταῦτα <δὲ> ἤτοι Sch-txt. | τὰ ἄλλα U M; τὰλλα Sch-txt; ἄλλα A Scl Hns. | τραγώσας U (et ante ms. repert. corr. Scl); τρυγώσας A Hns; *quae uel hirculant* G. | συμβαίνει. γινόμενον δ' ἐπὶ Sch-ann (partim cum Dlc, partim cum mrg-Vsc e G); συμβαίνει γιγνόμενον, ἐπὶ U A Hns (γινου. A Hns); γιγν. <Εἰ γάρ> ἐπὶ Sch-txt cum Mld; *reliqua: quibus idipsum ueniat. nam si in fructiferis ita fit. Cur non idem*, etc. G. | καρπύμων καὶ Wmr; καρπ. ἢ U A Scl Hns Sch. | ἀνθοφόρων Sch cum Mld; καρποφόρων U A Scl Hns. | τί κωλύει U M; τί δὴ κωλ. A Scl Hns Sch-txt. | ἄλλων Sch cum Mld (e G: *cur non idem in aliis quoque omnibus fiat*); ὄλων U M A (quod Scl retinend. cens.); ὄλως Hns. | πηρουμ. Sch cum Mld; τηρ-U M A Scl Hns G (*quasi ad fructificandum naturae ratione reseruetur*). | καρπογονίαν :-φορίαν mrg-Vsc. | σκέψασθαι U M; σκέψεσθαι

growing up spontaneously;⁸ but one of the two things must occur, either growth from the root or growth from seeds.

The woodsmen say that some of the congeners of these trees are sterile. It is likely either that the seeds escape their notice, or that, because the nourishment has been spent on other parts,⁹ these trees have actually become sterile, just as in the case of luxuriant vines¹⁰ and whatever plants have a like experience.¹¹

But when this phenomenon is found in fruit-bearing and flowering plants, what prevents it occurring in others not fruit-bearing? Let this be given merely as our opinion; more accurate investigation must be made of the subject and the matter of spontaneous generation must be thoroughly inquired into. To sum it up simply: this phenomenon is bound to occur when the earth is thoroughly warmed and when the collected mixture is changed by the sun, as we see also in the case of animals.

VI

It remains to speak of some other of the methods of propagation, such as the matter of grafting¹ and budding.² The account is simple and has practically been told before; the ingrafted

⁸ Probably Th. regards the conditions as unfavorable for the "rottings" and other changes associated with "spontaneous generation."

⁹ Arist. *P. A.* 2: 5 (651 b).

¹⁰ *I. e.*, vines with luxuriant growth of leaves; cf. Arist. *G. A.* 2: 7 (746 b 25f.); lit. lustful (used of she-animals). See Arist. *G. A.* 1: 18 (725 b-726 a).

¹¹ Possibly in passages like this Th. is also thinking of what we know as the males of dioecious trees. Such individuals would present an anomaly to persons who knew nothing of the real sexual nature of plants.

¹ Strasb. 253, 254. See in general *Enc. Brit.* 13: 743 a.

² Strasb. 255. See C. 5. 5. 4; C. 2. 17. 6. On grafting in general, see Bailey, pp. 1362-1371. Note H. 2. 1. 4, where Th. makes a promise apparently forgotten, or at least one whose fulfilment has been lost for us. (*H. P.*, ed. Bodaei 1644, p. 74). See Plin. *N. H.* 17 Chaps 22 to 26.

εἰρημένος πρότερον. ὥσπερ γὰρ γῆ χρήται <θατέρῳ> τὰ ἐμφυτευόμενα· καὶ φυτεία δέ τις καὶ ὁ ἐνοφθαλμισμός, οὐ μόνον παράταξις. ἀλλ' ἐνταῦθα δῆλον ὅτι καὶ τὸ βλαστάνον καὶ τὸ γεννῶν ἢ ὑγρότης ἐστὶν ἢ γόνιμος· ἦνπερ <ὁ> ὀφθαλμὸς ἔχων ἀρμόττεται θατέρῳ καὶ τὴν τροφήν ἔχων ἀποδίδωσι τὴν οἰκείαν βλάστησιν.

(2) εὐανξή δὲ πάντα τὰ τοιαῦτα διὰ τὸ κατειργάσθαι τὰς τροφὰς καὶ τὰς διὰ τῶν ἐνοφθαλμισμῶν ἔτι μᾶλλον· καθαρωτάτη γὰρ αὕτη, [καὶ] ὥσπερ ἐν τοῖς στελέχεσιν ἤδη τῶν καρπῶν. εὐπρόσφυτον δ' αἶε τῷ ὁμοίῳ τὸ ὅμοιον· ὁ δὲ ὀφθαλμὸς ὥσπερ ὁμογενές. εὐλόγως δὲ καὶ ἡ ἀντίληψις μάλιστα τῶν ὁμοιοφλοίων· ἐλαχίστη γὰρ ἡ ἐξαλλαγή τῶν ὁμογενῶν, καὶ ὥσπερ μετὰθεσις γίνεται μόνον· ἅμα γὰρ συμβαίνει καὶ τοὺς ὁποὺς ὀργᾶν καὶ τὰ ὅλα δένδρα πρὸς τὴν βλάστησιν, ὥσθ' ὅταν ὁμοίον τε ᾖ καὶ ὁμοιοπαθές τοῖς καρποῖς ἐξ ἀμφοτέρων εὐλογον τὸ τάχος τῆς αὐξήσεως· ἐν δὲ τοῖς ἄλλοις ὅσῳ ἂν ἡττων ᾖ καὶ τοῖς γένεσι καὶ τοῖς τόποις καὶ τοῖς καιροῖς παραλλαγῇ.

(3) εὐλογοὶ δὲ καὶ αἱ ὥραι μᾶλλον δὲ ἴσως ἀναγκαῖαι, καθ' ἃς καὶ ὅλως ἐπιβλαστήσεις γίνονται μετόπωρόν τε καὶ ἔαρ καὶ κυνὸς ἐπιτολή· δεῖ

1. ὥσπερ γῆ (superscripto γὰρ) U. | <θατέρῳ> conj. Wmr: ubi <τῷ ὑποκειμένῳ στελέχει> Hns (e G: subdito trunco) Sch; γῆ χρήται τὰ ἐμφυτ. U A; quae enim inseruntur: perinde ut terra: subdito trunco utuntur G. | τις καὶ ὁ ἐνοφ. U A Hns Sch; καὶ om. Wmr. non solum appositio: Sed etiam satio quaedam: inoculatio quoque ipsa dici . . . potest. G. | δηλονότι A. | γεννῶν <καὶ> ἢ Sch-txt, quod καὶ in Syll. iterum rejecit. | ὑγρότης (ῡ super γ scripto) U. | <ὁ> ὀφθαλμὸς Sch; ὁ om. U A Scl Hns. | ἀρμόττεται θατέρῳ: oculo aptissime se coniungit. G. | δῆλον ὅτι κτλ. sic corrigenda cens. Wmr: "δῆλον ὅτι αἰτία τοῦ βλαστάνειν καὶ τοῦ γεννᾶν ἡ . . . θατέρῳ ὅπερ . . . ἔχον." (nonne mendum pro: —ἡ . . . ὅπερ . . . θατέρῳ . . . ἔχον?); Sed hic tam illud quod germinat quam illud quod generat: humor foecundus procul dubio est quem habens oculus: oculo etc. G.

2. εὐανξή . . . καὶ τὰς corr. Scl e G; εὐάξη . . . καὶ ταῖς U M A (et ταῖς Hns); facile augescere possunt: quod alimenti copiam praeparatam confectamque secum attulerint. sed omnium maxime inoculationes G. | καθαρὸτατη A Hns. | αὕτη ὥσπερ Wmr; αὕτη καὶ ὥσπερ U A Scl Hns Sch. | ὥσπερ . . . καρπῶν om. G; ὥσπερ ἡ ἐν τοῖς τετελειωμένοις ἤδη κτλ. conj. Sch-ann. | τῷ ὁμοίῳ M A Scl Hns; τῶν ὁμοίων (in τῷ ὁμοίῳ erasum) U. | τὸ ὅμοιον U A Scl Hns; τὸν ὅμοιον M. | εὐλόγως U M A Scl Hns; εὐλογος Sch-txt. | ὁμοιοφλοίων corr. Sch; ὁμοφλοίων U A Scl Hns; quibus eadem corticis est natura G. | ὁποὺς U M Sch-txt;

part uses the other as an ordinary plant uses the ground. "Budding" also is really a kind of planting; it is not simply a mere mechanical juxtaposition, but it is clear that in this process both the germinating and the supporting force is the vital moisture. The "eye" having this moisture is suited to the other part, and the part having the nourishment grows the bud as though it were its own.

All such operations are attended by ready growth because the nourishment is, as it were, predigested, which is particularly true of budding; for in that process the nourishment is purest and similar to the sap right in the stems of fruits.³ It is always easy to grow like kinds on like; the "eye" is practically something growing on its kind. The reciprocal relation, too, is easily understood—especially in plants whose bark⁴ is similar, for there is the least need of adaptation between congeners—and the process amounts practically to a mere transposition. For it happens that at the same time the juices⁵ and the entire trees are eager for germination, so that whenever there is similarity of kind and of feeling for fruit on the part of both, it is reasonable that there should be speedy growth, the more so in each part, when their kinds, and habitats, and seasons of growth are the more similar.

It is well, in fact it is necessary, that the seasons⁶ be considered in which new growths are generally made, namely fall, spring, and the period of the Dog Star.⁷ For we must graft and

³ Th. probably thinks of such sap as nearest to perfect elaboration.

⁴ *Cambium*, probably.

⁵ Some texts: Fruits.

⁶ See H. 7. 10. 1 and also section 9 of this chapter. C. 1. 12. 8; C. 3. 3. 2; C. 4. 11. 10; Varro R.R. 1. 40. 3 quotes our passage.

⁷ Sirius (August 24 to September 24); H. 3. 5. 4; C. 3. 3. 3.

καρπὸς A Scl Hns Wmr; *succus* G. | ὅλα: ὅλλα M. | δμοῖόν τε ἢ U. | ὁμοιοπα-
θές: ὁμοιόπαθος?; (cf. ὀργᾶν supra). | καρποῖς U A Scl Hns Wmr; ὁποῖς Sch-
txt. | ὅσῳ ἂν ἦττων ᾖ Sch cum Mld et mrg-Vsc; ὅταν ἦττον' ὁ U A Scl Hns;
caetera quominus discrepent G. | τόποις conj. Wmr; ὁποῖς U A Scl Hns Sch;
succi G. | <η> παραλλαγή. Sch solus.

3. ἴσως: οἰνῖνο G (ὅλως legens?). | καθ' ἃς . . . ἐπιβλαστήσεις: καθ' ἃς καὶ

γὰρ ὀργῶντα φέρειν. παραπλήσιοι δὲ καὶ οἱ λόγοι καὶ περὶ ἐκάστης οἴπερ καὶ περὶ τῆς φυτείας. οἱ μὲν γὰρ τὴν ἑαρινὴν ἐπαινοῦσιν ἐπ' ἰσημερίαις ἔτι κύντων· ἅμα γὰρ τῇ ἐγκυήσῃ καὶ βλαστήσῃ καὶ ὁ φλοιὸς ἐπιφύεται καὶ περιλαμβάνει. οἱ δὲ περὶ τὴν ἐπ' ἀρκτοῦρῳ παραχρῆμα μὲν γὰρ οἶον ῥιζοῦται καὶ οἶον ἐπισυμμύει, προσφυῆς δὲ γενομένη πρὸς τὸ ἔαρ ἀθρόον ἀποδίδωσι τὴν βλάστην ἀπὸ ἰσχυροτέρας ἀρχῆς.

(4) εὐλόγως δ' ἔχει τὸ τὰς μασχάλας ἐνοφθαλμίζειν τὰς λειοτάτας καὶ νεωτάτας· ἀντιλαμβάνεται γὰρ ἐντεῦθεν μάλιστα διὰ τὴν τε λειότητα καὶ ἡλικίαν. εὗζωα γὰρ καὶ εὐβλαστή ἔστι τὰ νέα. μάλιστα δ' εὐφυῆ πρὸς ἐνοφθαλμισμὸν ὥς γ' ἐνὶ λαβεῖν ὅσων ἡ ὑγρότης ἔχει τι γλίσχρον, ἔτι δ' ἂ μαλακόφλοια καὶ ὁμοίόφλοια καὶ ὁμοιοπαθῆ· διὸ καὶ εἰς τὰ παραπλήσια φύσει καὶ ἡλικίᾳ κάλλιστος ὁ ἐνοφθαλμισμός· ἢ τε γὰρ γλίσχρότης [καὶ] ἀντιληπτική ὃ τε φλοιὸς μαλακὸς ὢν καὶ ὁμοίως εὐμενῆς [καὶ] οὐ ποιεῖ μεγάλην τὴν μεταβολήν.

(5) ἔστι δὲ τοῖς μὲν ἄλλοις βραχὺς ὁ καιρός, διὰ τὸ ταχεῖαν εἶναι τὴν βλάστησιν, τῇ ἐλάτῃ δὲ πλείων χρόνος διὰ τὸ πλείω χρόνον ποιεῖν τοὺς ὀφθαλμούς· ἔτι δεῖ ἀπαλὰ τὰ ἔρνη καὶ ἀθρόα διὰ τέλους καὶ τὸν τόπον

βλαστήσεις καὶ ἐπιβλ. scribendum cens. Scl; *si quidem germinatio germinum . . . fieri solet* G. | ἐπιτελῇ M. | ὀργῶντα corr. Hns (e G; *turgida*, et part. c. Scl); ὀργῶν U M A Scl. | μεταφέρειν pro φέρειν maluit Wmr. | περὶ ἐκάστης: *de singulis inoculationibus* G. | τῆς φυτείας U (in *φυ/τ*—*erasum*). | ἔτι κύντων: *arboribus* add. G. | ἐγκυήσῃ καὶ βλαστ. corr. Hns; ἐγκύσει βλαστ. U M A; καὶ <τῇ> βλαστ. Sch solus. | καὶ ὁ φλοιὸς U A Hns Sch; καὶ om. Wmr; *cortex quoque* G. | παρὰ χρῆμα A Wmr; παρὰ σχῆμα A-Bas ap. Sch. | οἱ δὲ <τὴν> περὶ Sch-txt; *alii eam praeferunt: quae exoriente arcturo: fieri solet*. G. | ἐπισυμμύει corr. Hns (e G; *maioremque immodum coire posse affirmant*. i. e.-μύειν); ἐπισυμαίνει U A et-μαίνει M. | προσφυῆς . . . βλάστην: *atque ita densata compage: germen ineunte uere: uniuersum erumpere: G.*

4. εὐλόγως U M A Scl; -γον Sch solus. | δ' ἔχει conj. Wmr; δὲ καὶ U A Hns Scl Sch. | τὰς λειοτάτας U M; τὰς τε λειοτάτας Sch; τὰς τελειοτάτας A Scl (qui *Gazae nitidissimas damnat*) Hns. | ἐντεῦθεν om. G. | τὴν τε λειότ. corr. Sch (e G: *leuitatis . . . causa*); τὴν τελειότ. U A Scl (alibi διὰ τελειότατα) Hns. | εὗζωα τὰ νέα καὶ εὐβλαστή Scl. | δὲ εὐφυῆ U. | εὐφυῆ πρὸς ἐνοφθαλμισμὸν ὥς U A Hns Sch; πρὸς ἐνοφθαλμισμ. om. Wmr; (sed in vers. lat. anni 1866 *ad inoculationem* habet). | ὥς γ' ἐνὶ Wmr; ὥς γ' ἐνὶ U; ὥς οὐκ ἐνὶ A; ὥς δ' ἐνὶ Hns; ὥς οὖν ἐνὶ Sch cum Mld; “ὥς οὐκ ἐνὶ λαβεῖν *fortasse expungenda*” Scl; *apta inoculationi: quibus humor lentescit* G. | ὅσον U. | ἔτι δ' ἂ Wmr (e G?); ἔτι δὲ U A Hns; ἔτι δὲ <τὰ>

bud when there is a longing for growth; and the observations about each season are like those that have to do with planting in the earth. Now some esteem the spring season, about the time of the equinox, when the trees are still "pregnant," for at the time when they are swelling and bursting into bud there is also a growing up of the bark which will envelop the scion. Others favor the season when Arcturus⁸ rises; for then the graft straightway roots, as it were, and closes up. Having then become firmly attached, the scion along toward spring buds forth vigorously because it has stronger vital principle.

It is well to set the buds in the smoothest and youngest axillary pits,⁹ where they will take hold most readily because of the smoothness and youth of the parts; for young parts are hardy and luxuriant growers. In brief, most ready for grafting and inoculation are the parts of all plants whose moisture has a certain amount of gumminess, and which have, besides, the same kind of tender bark and similar reactions. Thus the union by budding of plants of similar nature and age is the most effective. Gumminess, moreover, is a supporting force which, with a condition of tenderness and adaptability, makes the change no great one.¹⁰

In most plants the right period for grafting is brief because they germinate quickly; but for the olive more time is required because this tree takes a longer period to grow on its buds.

⁸ Mid-September.

⁹ The *cambium* seems to be particularly active at these points. See Ganong, pp. 208-211. Cf. H. 3. 15. 1.

¹⁰ Schneider quotes *Geop.* 3. 5. 3, and 4. 12. 7, 21.

Sch (e G). | ὁμοιόφλοια corr. Sch (e G); ὁμόφλοια U A Scl Hns; *Item quae cortice molli ac simili uestiuntur* G. | ὁμοπαθῇ bis ap. Scl, sed ὁμοιοπαθές in comment. | ἡλικίαν M. | [καί] . . . [καί] Wmr cum Sch-ann; καί . . . καί U A Scl Hns Sch-txt; *lentor enim appraehendi uim obtinet: et cortex mollem pariter: et benignum se exhibens: haud magnam facit mutationem* G. | μεγάλην μεταβολήν Scl.

5. ἔστι δὲ U; ἔτι δὲ A Scl Hns Sch-txt; *caeteris . . . datum est* G. | παχείαν M. | πλείων χρόνος διὰ Hns (e G; *plus temporis destinatum est*); πλείω χρόνον

αὐτῆς ὑγρὸν εἶναι πᾶν τὸ θέρος καὶ ἀπὸ τούτων μάλιστα πάντων βλαστάνει. διὰ τοῦτο οἴονται τινες καὶ τεττάρas καὶ πέντε μῆνας ἀρδεύεσθαι τὴν ἐμφυτείαν.

(6) τὸ δ' ὕδωρ τῷ μὲν ἐνοφθαλμισμῷ πολέμιον· ἐκσῆπει γὰρ καὶ ἀπόλλυσι παραρρέον διὰ τὴν ἀσθένειαν· διὸ καὶ ἐπὶ κυνὶ δοκεῖ ἀσφαλέστατος εἶναι, καίτοι νῦν γέ τινες οὕτως περιδοῦσι τοῖς φλοιοῖς ὥστε μὴ παραρρεῖν. τῇ δ' ἐμφυτείᾳ χρήσιμον ἂν μὴ ὑγρὸν ἢ τῇ φύσει· διὸ καὶ οἱ μὲν αὐτῷ πηλὸν ἐπικολλαίνουσιν, οἱ δὲ χύτραν προσβάλλουσιν ὕδατος ὥστε κατὰ μικρὸν ἐπιρρεῖν· ἀναξηραίνεται γὰρ ἂν τύχη μὴ ἔχον ὑγρότητα, διὰ τὸ μέγεθος τῆς ἐλκώσεως.

(7) ὁρθῶς δὲ καὶ διατηρεῖν ἀρραγῇ τὸν ὀφθαλμὸν καὶ τὸν φλοιὸν καὶ τὸ ἔνθεμα οὕτως ἀποξύνειν ὥστε μὴ γυμνοῦν τὴν μήτραν· ῥαγέντος γὰρ ἢ γυμνωθείσης ἀναξηραίνεται καὶ διαφθείρεται. διὰ τοῦτο γὰρ καὶ περιδοῦσι φιλύρας ἕξωθεν φλοιῷ καὶ ἐπὶ τούτοις περιαλείφουσι πηλῷ τετριχωμένῳ ὅπως ἔμμονος ἢ ὑγρότης ἢ καὶ μήθ' ἥλιος μήθ' ὕδωρ μήτε ψύχος παραλυπῇ.

διὰ U M A. | ἔτι δεῖ Wmr e Sch-ann cum mrg-Vsc; ἔτι δὲ U A Scl Hns Schtxt. | τὰ ἔρνη Sch-ann (partim c. mrg-Vsc); ἐρινὰ U A Scl Hns; ἐρινὰ καὶ ἀθρόα fortasse delenda cens. Scl; ἀθρόα διατηρεῖν conj. Lnk (ap. Sch.). | τόπον αὐτοῖς . . . ἀπὸ τοιοῦτων maluit Scl. | ὅτι δὲ ἀπαλὰ . . . τέλους, καὶ . . . εἶναι <δεῖ> πᾶν κτλ. Keil (ap. Hindenlang pag. 36). | *Ad haec humidi tenellique: petendi surculi sunt. Ipsumque locum per totam aestatem humescere convenit* G (Graece(?): ἔτι δεῖ ὑγρά καὶ ἀπαλὰ τὰ ἔρνη καὶ τὸν τόπον αὐτὸν ὑγρὸν εἶναι πᾶν τὸ θέρος, quod mihi placet). | διὰ τοῦτο Sch-ann (e G: *quamobrem*); διὰ γὰρ τούτων U A Scl Hns. | ἀρδεύεσθαι maluit Sch-comm; δεύεσθαι U A Hns; *rigari oportere* G Scl.

6. καίτοι νῦν γέ Wmr (c. Sch-auct); καὶ τοίνυν γέ U A Hns; νῦν om. Sch-txt; *et quidam corticibus ita praeligant*: G. | οὕτως U M; οὕτω A Hns Sch. | παραρεῖν U. | ὑγρὸν ἢ Scl; ἢ ὑγρὸν A Sch Wmr; ἢ ὑγρά (olim ὑγράι?) U; —ὑγρῷ M; (vide Hindenlang pag. 43); *arbor* add. G. | αὐτῷ Sch-syll; αὐτῶν U A Scl Schtxt; om. G. | ἐπικολλαίνουσιν U (et λ semel M); ἐπικολλαίουσιν A Scl Hns. | ὥστε . . . ἐπιρρεῖν: *quae assidue instillet* G. | ἂν τύχη Wmr (edit. Didot autem in versione lat. ipsa verba Gazae reddit, ut infra). | ταχὺ U A Scl Hns; ἐν τάχει Sch-txt; ἀναξηραίνεται γὰρ ἂν ταχὺ fortasse legenda?; *pre magnitudine ulneris: ut citissime resiccetur*: G. | μὴ . . . ἐλκώσεως: *nisi humorem extrinsecus habeat illibare* G.

Furthermore the young scions must be tender and firm all through, and the site of the bud must be kept moist all summer, from which conditions the best growth results. Some think, therefore, that the graftage should be watered for from four to five months.

Water, however, is inimical to graftage, when it seeps through and causes rot, and finally kills the germination because the latter is weak. Thus the season of the Dog Star seems the safest. Even at that time, however, some bind the graft about with bark to keep out the seepage. On the other hand, water is good for the graftage¹¹ if the latter is not naturally moist. Accordingly some daub clay over the joint; others place alongside a pot of water in such a way that it will slowly trickle over the graft,¹² the latter drying up if it happens not to have moisture. This is due to the size of the wound.¹³

It is right, too, to preserve the "eye" and the bark uninjured and to shave off the scion in such a way as not to expose¹⁴ the inner soft wood; for if this be broken or exposed, the "eye" will dry up and perish, which is the reason why they bind bast outside the bark,¹⁵ and on top of that smear clay mixed with hair, to keep in the moisture and to keep sun or rain or cold from harming the graft.

¹¹ *Geop.* 10. 75. 19 (*ap.* Sch).

¹² Varro *R.R.* 1. 41, 2; Plin. *N. H.* 17: 121 (26).

¹³ Lit. ulceration. The primitive verb, however, means to draw. May Th. be speaking of the quantity of water (*i. e.* sap) that must be drawn?

¹⁴ *I. e.* the soft wood (Varro: *medullam*) of the scion should not appear after the graft is in place.

¹⁵ Cf. Varro *l. c.*

7. καὶ διατ. U; ὁ διατ. M; εἰς τὸ διατ. A Scl Hns Sch-txt. | <καὶ> τὸ ἐνθ. Sch; et surculum sic acuiere G; (i. e. ἀποξύνειν, ut Plin.). | ῥαγέντος . . . γυμνωθείσης: *Rupto et enim oculo: corticeae: aut medulla nudata* G. | ἀρραγεί . . . γυμνωθείσης . . . ἀναξηρήνεται U. | φιλύρας ἔξωθεν φλοιῷ Wmre G (c. Hns, ubi autem: φλοιοῖς); φιλύραι κενωθὲν φλοιοὶ U; φιλύρα κενωθὲν (φιλορακένωθεν M) φλοιοὶ A; φιλύρα τὸ κενωθὲν τοῦ φλοιοῦ conj Scl; φιλύραις καὶ φλοιοῖς conj. Sch; *foliis et corticibus insuper obtegunt: atque alligant. Limoque crinito obliniunt:* etc. G. | ὑγρότης ἢ U.

(8) καὶ ὅταν σχίσαντες ἐντιθῶσι τὸ ἐνθεμα, σφηνοειδὲς ποιήσαντες ἐν σφύρα ἐλαύνουσιν, ὅπως ὅτι μάλιστα προσαχθῇ· χρή δὲ καὶ τῆς ὑγρότητος τῆς αὐτῶν συμμετρίαν τινὰ ὑπάρχειν. διὸ καὶ τὴν μὲν ἄμπελον προαποτέμνουσιν ἡμέραις τρισὶ πρότερον, ὅπως προαπορρυῇ τὸ δάκρυον καὶ μὴ σήπηται μηδ' εὐρωτιᾷ· ῥόα δὲ καὶ συκῇ καὶ ὅσα τούτων ἐστὶ ξηρότερα παρὰ χρήμα.

(9) δεῖ δὲ καὶ πρὸς τὰς χώρας λαμβάνειν τὰς οἰκείας ὥρας καὶ πρὸς τὰς τῶν δένδρων φύσεις· ἐπεὶ τὰ μὲν ἔνυδρα, τὰ δὲ ξηρά. καὶ λεπτογείῳ μὲν ἄμεινον τὸ ἔαρ· οἰκείον γὰρ οὕτως διὰ τὸ ὀλίγον ἔχειν τὸ ὑγρόν· ἐν δὲ τῇ εὐγείῳ καὶ πηλώδει τὸ μετόπωρον· τοῦ γὰρ ἥρος πολλὴ λίαν ἡ ὑγρότης πρὸς τὸ διατηρεῖν ἕως ἔτι διαμένει τὸ δάκρυον. ὀρίζονται δὲ τινες τοῦτο τριάκονθ' ἡμέραις. (10) εὐλογον δὲ καὶ τὸ καλλικαρπότερα ταῦτα γίνεσθαι, καὶ μάλιστα ἂν τὰ ἡμέρα εἰς τὰ ἄγρια τιθῇται τῶν φυτῶν· εὐτροφία γὰρ συμβαίνει πλείων διὰ τὴν ἰσχὺν τῶν ὑποκειμένων· διὸ καὶ κελεύουσι κοτίνους φυτεύσαντας ἐνοφθαλμίζειν ἢ ἐμφυτεύειν ὕστερον. ἀντιλαμβάνονται γὰρ μᾶλλον ἰσχυροτέρου καὶ τροφὴν ἐπισπώμενα πλείω καλλίκαρπον τὸ δένδρον ποιεῖ· ἐπεὶ εἴ γέ τις ἀνάπαλιν τὸ ἄγριον εἰς τὸ ἡμερον ἐμβάλλοι, διαφορὰν μὲν τινα ποιήσει, τὸ δὲ καλλικαρπεῖν οὐχ ἔξει. καὶ τὰ μὲν περὶ τὰς φυτέας καὶ τὰς ἐμφυτέας ἱκανῶς εἰρήσθω.

8. ἐν σφύρα: ἐν delend. cens. Scl; lacunam susp. Sch-cur. | σφηνοειδὲς . . . ἐλαύνουσιν: *Surculum cuspidatim decessum: maleo adigunt: ut quam maxime deprimatur: lecticaeque committatur* G. | συμμετρίαν A; συμμετρίας U (N posteriore manu super s fusum est) M. | τρισὶ Sch (e Var. R. R. 1. 41. 3, *triduo ante*); τισὶ U M A Hns; *aliquot antea diebus* G. | σήπηται U. | εὐρωτιᾷ: *uermiculetur* G. | παρὰ χρήμα U; *potius inserere solent* G.

9. πρὸς τ. χ. λαμβάνειν M;—προσλαμβάνειν U A Scl Hns; τ. χ. προσλ. τὰς οἰκ. καὶ <τὰς> ὥρας πρὸς κτλ. Sch-syll. | οἰκείας U Scl Hns; εἰκείας A. | ἔνυδρα U A; ἔνυγρα Scl; *solo ulginoso* G. | λεπτογείῳ μὲν Wmr; λ. καὶ U; λεπτόγεια καὶ A Scl Hns; <ἐν μὲν τῇ> λεπτογείῳ ἄμεινον Sch; *sicienti et gracili* (sc. solo) *melius degant. Ver illis sicciscentibus rectius profecto accomodetur.* G. | ὀλίγον: *minus succi* G. | ἥρος U A Scl Hns; ἔapos Sch. | ἡ ὑγρότης U; ἡ om. A Scl Hns Sch. | διαμένη U (in-ei postea mutatum); διαμένειν M. | τοῦτο U (cum rasura; olim fortasse τοῦτα!).

10. ἡμέρα: *urbania* G. | φυτῶν Sch cum mrg-Vsc; φλοιῶν U A Hns; om. G. | ὑποκειμένων: *subdilaie arboris* G. | φυτεύσαντας Sch;—τες U A Hns Wmr. | διὸ . . . ὕστερον: *Quamobrem satis oleastris: iriserere* (inserirere ap. Hns) *postmodum uel inoculare praecipiunt.* G. | ἰσχυροτέρου Wmr;—τερον U A Hns Sch. | ἐπισπώμενα

Whenever they have split the trunk, they insert the scion which they have fashioned to a wedge shape; and then with a mallet they drive it in to make it fit as snugly as possible. There must here also be a balance in the amount of moisture between scion and stock. It is for this reason that they cut off¹⁶ the vine three days¹⁷ before grafting in order that the gum ("tear") may first run off and that it may not rot or mould. Pomegranate and fig and whatever trees are drier must be grafted immediately.

We must also consider the proper seasons in regard to both the situation and the nature of the trees, since some of them prefer watery, some dry places. For a light soil the season of spring is suitable because such soil has little moisture; but in rich and clayey soil fall is better. In spring, moreover, there is far too much moisture, making it necessary for one to wait to set the graft until the gum stops, a period which some folks set at thirty days.

It is reasonable to suppose that graftage will produce more beautiful fruit, especially if the cultivated is grafted on the wild; for there results a richer supply of nourishment because of the strength of the supporting plant. Wild olive we are accordingly counselled to sow and then to bud or graft on it later; for a better start is obtained from a stronger stock, and more nourishment is drawn up to make the tree bear fine fruit. Now, on the other hand, if anyone graft the wild on the cultivated, he will in truth produce a change in the fruit; but it will not be a better one. As for planting and grafting let this suffice.¹⁸

¹⁶ H. 9. 1. 6.

¹⁷ Others read: some days.

¹⁸ On grafting, see Palladius *passim*, but especially 3:17; 4: 1 and Book 14 entire. See also Verg. *Georg.* 2: 74-77 (budding), and 2:78 ff. (grafting).

A Hns; -μερον U. | πλείω om. Hns. | ἀντιλαμβ. . . . ποιῇ: *coeunt enim et apprehendunt ualidius: et radix plus attrahens nutrimenti: probe fructificare arborem facit.* G. | διαφορὰν U A Hns; -φθορὰν M.

VII. Τὰ δὲ σπέρματα πάντων ἔχει τινὰ τροφήν ἐν αὐτοῖς, ἢ συναποτίκτεται τῇ ἀρχῇ καθάπερ ἐν τοῖς ὠοῖς· ἢ καὶ οὐ κακῶς Ἑμπεδοκλῆς εἴρηκε φάσκων “ὠοτοκεῖν μακρὰ δένδρεα.” παραπλήσια γὰρ τῶν σπερμάτων ἡ φύσις τοῖς ὠοῖς· πλὴν ἔδει περὶ πάντων εἰπεῖν καὶ μὴ μόνον τῶν δένδρων· ἅπαν γὰρ ἔχει τινὰ τροφήν ἐν αὐτῷ. διὸ καὶ δύνανται διαμένειν εἰς χρόνον οὐχ ὥσπερ τὰ τῶν ζώων εὐθὺς φθείρεται χωριζόμενα πλὴν τὰ τῶν ὠοτόκων. ταῦτα γὰρ ὥσπερ εἴρηται τροφήν ἔχοντα καὶ φυλακὴν ἅμα τῆς ἀρχῆς διαμένει.

(2) χρονιώτερα δὲ ἐτέρων ἕτερα, καὶ μάλιστα [τὰ] πυκνὰ καὶ ξηρὰ καὶ ξυλώδη καθάπερ τὰ τοῦ φοίνικος· οὐκ ἔχει γὰρ οὔτε ἔξωθεν οὐδεμίαν παρείσδυσιν οὔτε ἐν αὐτοῖς ὑγρότητα τὴν διαφθειρομένην. ὅθεν καὶ οὔτε θηριόυται καθάπερ τὰ σιτηρὰ τῶν σπερμάτων οὔτε ἀναξηραίνεται καθάπερ τὰ τῶν λαχάνων, ἀλλ’ ἐν αὐτοῖς περιστέγοντα σφῶζει τὴν ἀρχήν. ὅτι δ’ ἐν ἅσασι σπέρμασι <τροφή> κακείθεν δῆλον· ἃ γὰρ δοκεῖ ξηρὰ καὶ ὥσπερ κελυφανώδη πᾶμπαν οἶα τὰ τῶν λαχάνων, ταῦτα κινεῖται κατὰ τὰς οἰκείας ὥρας, ἐὰν καὶ ὅτιοῦν ἱκμάδος λάβῃ· καὶ διὰ τοῦτο ἐν ὑπερώοις τιθέασι καὶ κρεμάννυσιν ἐν ἀρρίχοις καὶ οὔτε ραίνουσιν οὐθ’ ὕδωρ ὅλως εἰσφέρουσιν εἰς τὰ οἰκήματα.

1. ἔχει U Hns; ἔχειν M A Scl. | ἢ συναπ. corr. Scl; ἢ συναπ. U A M; καὶ σ. Hns; *aliquid in se . . . quod . . . natura profundit* G. | ὠοῖς, ὠοτοκεῖν, etc., U (plerumque); de forma ὠόν, ut vere hellenistica, cf. Boissacq, pag. 1082, s. v. φόν). | ἢ καὶ corr. Scl; ἡ κ. U; ἡ κ. A Hns; *qua de causa* G. | δένδρεα Sch-comm (c. Arist. G. A. 1. 25); δένδρα U A Scl Hns. | παραπλήσια (male) Wmr et Wmr-Did. | χρόνον U M; χρόνους A Scl (“*plurale ad diversitatem, — non enim omnibus eadem διαμονή.*”) Hns. | ζῶων <ῶά> εἰθ. Sch solus (qui 4. 6. 4. cft.). | εὐθὺς Sch cum mrg-Vsc; εὐθὺ U A Hns.

2. διαμένη U (in-ei rec. manu correctum). | μάλιστα πυκνὰ U (omisso τὰ) quod placet. | αὐτοῖς ὑγ. corr. Scl (et habet forte U); αὐτοῖς A Hns Sch Wmr (qui autem, ed. Did., *in se* vertit); *nec humor ullus includitur* G (quae verba, versionibus latinis, retinent et Hns et Sch). | αὐτοῖς περισ. corr. Sch cum Dlc (e G: *sed mira soliditate munita; suum tutantur illud genitale principium*); αὐτῷ (spiritus rec. manu additus) περιστέγον U (et conjecerat Scl); αὐτῷ π’γον M; αὐτοῖς π’γον A; αὐτοῖς τὸ π’γον Hns. | σπέρμασι <τροφή> κάκ. Sch cum mrg-Vsc (e G: *omnibus . . . seminibus aliquid pabuli inesse; hinc etiam constat.*); σπερμάτων κάκ. U M; σπέρματα, κάκ. A Hns. | κελυφανώδη U A (*putaminacea* Scl); κολυφώδη Hns (pro κελυφώδη); *putaminea* G. | ὥρας corr. Scl e G (*temporibus*); χώρας U M A. | κρεμάννυσιν corr. Wmr;

VII

But all plant seed has in itself a certain amount of nourishment which is produced with it at the beginning, just as is the case in eggs.¹ Wherefore the remark of Empedocles² is not badly put when he says: "And the tall trees oviposit"; for the development of seeds is very much like that of eggs except that we must extend Empedocles's dictum to include the seeds not only of trees but of all plants, for every kind of seed has nourishment³ in itself. Seeds are therefore capable of lasting for some time and are not like those animals' eggs that perish at once when separated from the parent.⁴ An exception is to be made for the eggs of oviparous creatures; for they, as was said, have sustenance and at the same time a power of conserving the vital force, which conditions enable them to persist.⁵

Some seeds, however, are longer-lived⁶ than others. This is especially true of those that are dense, dry, and woody, like those of the date palm; for they admit no penetration from the outside, nor have they in themselves any moisture to promote decay. Hence it happens too that they are not infected by insects⁷—as are the seeds of grains—nor dried up like the seeds of garden herbs; but they protect and keep their vital principle. But that there is nutriment in all seeds is clear also from this fact: namely, that those that appear wholly dry and, as it were, husklike, such as the seeds of garden herbs, are all incited to germinate according to their own proper seasons if they get

¹ Arist. *H. A.* 1: 5 (489 b).

² Windelband p. 77; cf. Arist. *G. A.* 1:23 (731 a).

³ C. 4. 6. 6.

⁴ Arist. *G. A.* 2: 4 (737 b).

⁵ On the material in sections one to three of this chapter, compare C. Bk. 5, Chap. 18.

⁶ C. 1. 4. 2; C. 4. 2. 1.

⁷ C. 5. 18. 1, 2.

κεκρεμάννυσιν U; κεκραμάννυσιν M; κρεμανδουσιν A Hns (et-μανν-Sch-txt). |
 ἐν ἀρρίχοις U (an super ἀρ-recentiore manu adscriptum) et, ante Ms. reper-
 tum, Sch cum Casaub. ad Athen. 3. 4., et mrg-Vsc;—ἀξαρρίχοις M A Scl;—
 καφαρίοις Hns; suspenduntque eminentius G. | ῥένουσιν M. | εἰσφέρουσιν Sch cum
 mrg-Vsc; ἐκφέρ. U A Hns; afferunt G.

(3) τῶν δὲ δὴ λοιπῶν καὶ τῇ αἰσθήσει φανερά τὰ πρόσοντα· καὶ τὰ γε δὴ τῶν σαρκωδῶν ὥσπερ γαλακτοῦται διαβλαστανόντων. σχεδὸν δὲ ὁμολογοῦμενον τοῦτο καὶ ἐπὶ τῶν ζώων ἐστίν· οὐδὲ γὰρ ἐν τοῦτοις ἅπαν τὸ κατὰ πρόεσιν σπέρμα καθαρὸν καὶ εἰλικρινὲς ὑποληπτέον.

ὅσα δὲ ξυλῶδη καὶ πυρηνῶδη περίκειται τισι φυλακῆς χάριν οἰητέον, ὥσπερ καὶ τὰ δερματικὰ καὶ ὑμενώδη. πάντα γὰρ ταῦτα πρὸς τὴν σωτηρίαν ἐστίν· ὑγρὰ γὰρ ἡ ἀρχὴ δυνάμει πάντων. (4) ἔχουσι δὲ τινων τὰς ζωτικὰς ἀρχὰς ὥσπερ ἐλέχθη καὶ ρίξαι καὶ ἀκρεμόνες καὶ ξύλα καὶ καυλοὶ χωριζόμενοι τῶν φυτῶν, ὥστε κινεῖσθαι μέχρι τοῦ βλαστάνειν οἷον αἶ τε σκίλλαι καὶ ὅσα σκιλλῶδη καὶ τὰ τῆς ἐλάας ξύλα καὶ οἱ τῶν κρίνων καυλοὶ καὶ οἱ τῆς βλήχρου κλώνες. ἀνθεῖ γὰρ καὶ αὕτη περὶ τροπᾶς, ὃ δὴ καὶ μάλιστα θαυμαστόν· ἐπεὶ τὰ γ' ἄλλα φαίνεται τινα ἔχειν ὑγρότητα κούφην καὶ γλίσχραν τὰ δὲ λιπαράν, καὶ ἔτι περιέχεσθαι τὰ μὲν χιτῶσι πλέοσι τὰ δὲ πυκνότητι τῇ αὐτῶν, ὥστε μὴ εὐξήραντα εἶναι· τοῦ δ' ἀέρος μεταβάλλοντος καὶ τῆς οἰκείας ὥρας συμπαθῇ τε γίνεται καὶ βλαστάνει.

3. λοιπῶν (in-ων correctum) U. | διαβλαστανόντων U et, ante Ms. rep., conj. Sch; διαλαμβανόντων A Scl Hns; om. G. | κατὰ προ/// εἰν (litteris tribus erasis quarum ultima certe ρ) U: προσάρεσιν fuisse videtur (forte pro πρόσαρσιν?), cf. προσαραρίσκω, vel προσίρεσιν (i. e. προσείρεσιν, cf. προσείρω Suid.); καταπρόεσι M; κατὰ προῖν A Scl ("quare dixit, (sic) nescio") Sch-txt; ἔξω προῖν Dlc; neque enim quod ab his emittitur totum semen purum sincerumque arbitrandum G. | πυρηνῶδη Scl; πυρρην. A Hns; πυρρινῶδη U (rec. manu in πυρρονῶδη mutatum, quod habet M!). | τισι om. G. | φοιλακῆς U (in φυ/λ erasum). | οἰητέον U A Hns; οἰκτέον M; putandum G. | πάντα γὰρ ταῦτα U A; ταῦτα om. Hns; haec enim omnia G.

4. τινων U M; om. A Hns Scl; sunt quorum radices G. | φοιτῶν (in φυ/τῶν eras.) U. | κινεῖσθαι conj. Sch-ann; κινεῖ καὶ U M; κινεῖν καὶ A Scl Hns; κινεῖται Scaligero in mentem venisse videtur; mouere se ualet G. | αὕτη Sch-comm (e G: ea quoque); αὕτη U A; αὐτοὶ (?) Scl. | ὃ δὴ U M; δὴ om. A Hns. | ἐπεὶ τὰ γ' U (et Sch-comm ante Ms. repert.); ἐπεὶ τὰ τ' M; ἐπεὶ τὰ τε A Hns (et Scl, sed "ἐπὶ"—); caetera enim G (simplicius). | λιπαράν Sch cum mrg-Vsc; λιπαρά U A Scl Hns. | χιτῶσιν πλείοσιν U (in-σι πλέοσι eras.);—πλέοσι M Sch; πλέοσι Wmr; πλ. om. A Hns; tunicis pluribus G. | αὐτῶν A Wmr; αὐτῶν U Hns Sch. | εἶναι. τοῦ δ' ἀέρος κτλ. Sch cum G; εἶναι τοῦ ἀέρος μεταβάλλοντος. καὶ κτλ. U A Scl Hns. ὥρας corr. Scl ("sc. προϊούσης"); χώρας U A Hns; quominus possint siccari. tum aere locoue proprio mutato afficiuntur: et germinant G.

ever so little moisture. Accordingly they are placed in wicker baskets and hung in the upper rooms of the house. Moreover the rooms where they are kept are not sprinkled, nor is water even taken into them at all.

In other seeds the presence of nourishment is evident to the sense. In fact, some of the "fleshy"⁸ sort turn, as it were, to milk when they germinate. About the same thing, it is agreed, takes place with animals; for it must not be supposed in their case that all the seed as emitted is pure and unmixed.⁹ But we must regard as protective whatever woody and stony parts lie about any seeds, as we must also regard any leathery and membranous parts; for all these have to do with preserving the seeds, since moisture is the vital principle in them all.

In some plants too, as was said, the vital principle is possessed by roots and boughs and woody parts and stalks, separated from the plants, so that these can be stimulated to growth as can squill and its congeners, and the woody parts of olive, and the stalks of lilies, and the twigs of *blechrus*;¹⁰ for this flowers at about the winter solstice, a fact that is particularly remarkable. Again, others seem to have a certain sort of moisture that is light and sticky, and some a greasy sort. Furthermore, some are enveloped in several tunics; others by their own thickness are kept from drying too easily. But if there is a change in the atmosphere and the right season comes along, they respond and put forth shoots.

Now the *blechrus* seems entirely dry; but it must clearly have some of this sort of vital principle which is stirred up by the moving and change that take place at the same time in the air. The matter of its season too is remarkable in that it is

⁸ *I. e.* albuminous (as grains, castor beans, etc.); cf. C. 4. 4. 7, 8; H. 8. 6.1; and see Ganong, Chap. 8, Sections two and three, and in general H. 1, Chap. 11.

⁹ C. 5. 18. 2.

¹⁰ *Pulegium* says Schneider, with Plin. and Arist. *Prob.*; but the pennyroyal, in spite of its season of blooming, etc., is scarcely the type of plant implied here. L. and S. have simply "a woody plant flowering late," which definition is obviously derived from our passage. See Plin. *N. H.* 18: 227 (60), *puleium*, and cf. 2: 108 (41) and 19: 160 (47). See especially Arist. *Prob.* 20: 26 (speaking of dry plants kept inside in winter).

(5) ἡ δὲ βλήχρος ξηρὰ φαίνεται παντελῶς, ἀλλὰ δῆλον ὥς ἔχει τινὰ τοιαύτην ἀρχήν, ἣ κινεῖται τῇ τοῦ ἀέρος ἅμα μεταβολῇ καὶ ἀλλοιώσει. θαυμαστὸν δὲ καὶ τὸ τῆς ὥρας· οὐ γὰρ ἀνιεμένης ἀλλὰ μᾶλλον ἐπιτεινούσης, εἰ μὴ ἄρα περὶ τὰς ἀλκονίδας· ἱκανὸς γὰρ ὁποσοσούν χρόνος εἰς τὰς τῶν ἀσθενῶν καὶ μικρῶν μεταβολάς. αἱ μὲν οὖν γενέσεις, πόσαι τε καὶ ποσαχῶς καὶ τίνες ἐκάστοις οἰκείαι, φανερόν ἐκ τῶν εἰρημένων.

VIII. Εὐβλαστὴ δὲ καὶ εὐαυξή τὰ ἐκ τῶν φυτευμάτων μᾶλλον ἢ ἐκ τῶν σπερμάτων εὐλόγως, ἄλλως τε καὶ ὑπόρριζ' ἂν ληφθῇ· προϋπάρχει γὰρ πολλὰ τῶν μορίων ἃ δεῖται μόνον τροφῆς· τῶν δ' ἐκ τῶν σπερμάτων ἅπαντα ταῦτα ἀνάγκη γεννᾶσθαι πρῶτον ἔπειθ' οὕτως αὐξηθῆναι. τὸν αὐτὸν δὲ τρόπον καὶ ὅσα ῥιζοφυῇ τυγχάνει καθάπερ τὰ κεφαλόρριζα. καὶ γὰρ ἐν τούτοις προϊσταται τῆς φύσεως, ἐξ ᾧ πλείων ἢ ὁρμὴ πρὸς τὴν βλάστησιν ἢ τῶν σπερμάτων. ῥιζωθῆναι γὰρ ἐκεῖνα δεῖ πρότερον. (2) ὅσα δὲ κατὰ τὰς ἰδίας φύσεις, ὡς ἂν γένος πρὸς γένος [ὁ] συγκρίνων λάβοι τις, πότερα κατὰ τὰς εὐθύτητας τῶν πόρων ληπτέον, ὥσπερ Δημόκριτος· εὖρους γὰρ ἢ φορὰ καὶ ἀνεμπόδιστος ὥς φησιν· ἢ μᾶλλον ὅσα μανότερα

5. βλήχρος A Scl Hns; βληχρὰ U M; *Blechrus* G. | δῆλον ὥς U A Hns; δῆλον ὅτι Sch-txt e mrg-Vsc; ἀλλὰ δεῖ ὅμως ἔχειν τινὰ κτλ. *legisse videtur G: Verum quamvis ita sit: principium tamen quoddam eiusmodi habeat necesse est.* | καὶ τὸ τῆς U M; καὶ om. A Hns. | ὥρας corr. Scl; χώρας U M A Hns. | θαυμαστὸν . . . ἐπιτεινούσης: *mirum praeterea quod non remissa; sed potius intenta seuilia temporis: germinare incipiat.* G. | ἀλλὰ μᾶλλον U; ἀλλ' εὐ μᾶλ. A Scl Sch-txt; ἀλλὰ εὐ μ. Hns. | ὁποσοσούν U A; ὁπόσος οὖν Hns; ὁποιοσούν maluit Scl ("hic non de quantitate sed de qualitate temporis loquitur." 32. 1. A.) | μικ. κα. ἀσθ. Scl.

1. εὐαυξή U (ut plerumque). | φυτευμάτων U; φυτευσόμενων A Hns Sch-txt; *quae planta sint sata* G. | ἢ ἐκ τῶν Wmr; ἐκ om. U A Hns Sch. | καὶ ὑπόριζ' ἂν U; καὶ ὑπόριζαν M; καὶ ὑπὸ ῥίζαν A Scl (cui autem "non placet"); καὶ ὑπόρριζα Sch-txt cum Hfm (e G: *si radice aliqua fibrata petantur*); ὑπόρριζον maluit Mld ap. Sch. | μορίων: *partes . . . adultas* G. | γεννᾶσθαι . . . πρῶτων (sic) in πρῶτον erasum U. | γεννᾶσθαι . . . αὐξηθῆναι: *generari priusquam incrementa incipiant* G. | ῥιζοφυῇ (ἡ ferme eraso) U. | κεφαλόριζα U A. | τυγχάνει: *facilius augentur* add. G. | προϊσταται omnes; προϋφίσταται conj. Sch-comm; *progenitum est* G. | τῆς φύσεως U A Scl; τι φύσεως Hns solus.

2. φύσεις <εὐβλαστῇ> Sch-syll (e G: *quae autem naturae suae ratione praevalent.*). | ὁ συγκρίνων U A Hns; ὁ damnat Sch-comm et [ὁ] syll. | πότερα

not milder but rather more rigorous except around the "halcyon days,"¹¹ for ever so little time is sufficient for the change into life in delicate and small plants.

The methods of propagation—their number, their ways of accomplishment, and their peculiarities for each plant—have been shown in the statements made.

VIII

Now that growth from sets, rather than from seeds, is more easy and vigorous, is readily understood, especially if rooted plants are taken; for there are available most of the elements needed, excepting only nutriment. In growth from the seeds, on the other hand, all these things must first be brought into being before development can take place. The same is true for all those that are "root grown,"¹² such as bulbous plants. And, as a matter of fact, in these plants there is an advance in nature in so far as there is a greater impetus to germination than there is in simple seeds; for the latter must first get roots.

But as to all those that, according to their own natures, grow easily—as one might judge, comparing them kind with kind—we must determine whether we are to find the reason, as does Democritus, in the straightness of their passages—"for the course of the sap is easy-flowing and unimpeded" as he says—

¹¹ Fourteen days of calm weather in winter when the *halcyon* (kingfisher?) builds its nest (cf. Ar. Av. 1594; Theoc. 7. 57); according to Arist. H. A. 5: 8 (542 b), seven days before and seven days after the winter solstice; Arist. quotes Simonides (Fr. 12, Bergk). See Plin. N. H. 10: 90 (47); but cf. Colum. 11. 2. 21.

¹² The term "root" is, of course, here used in the sense that it had for Th., i.e., any underground growth; a bulb, in modern nomenclature is, strictly speaking, a stem.

καὶ ὑγρότερα; τὰ μὲν γὰρ πυκνὰ καὶ ξηρὰ δυσάυξητα. πᾶν γὰρ ἔμπυρον τὸ πυκνὸν καὶ ξηρὸν καὶ πικρὸν, ὥστε βραδεῖαν εἶναι τὴν ἐπίδοσιν· θατέρου δ' ἐν ὀλίγῳ πολλὴ διὰ τὴν μανότητα· καὶ ὅλως ἡ μανότης εὐβλαστὸν τι καὶ εὐτροφον. (3) σημεῖον δὲ καὶ τὸ κατὰ τοὺς τόπους καὶ τὰς φυτείας συμβαῖνον. ἐν μὲν γὰρ τοῖς εὐδιεινοῖς καὶ ἀπνευμάτοις ἔτι δὲ ὅταν ἡ φυτεία πυκνὴ εὐαυξῇ μὲν τὰ δένδρα μανὰ δὲ καὶ ὑγρὰ μᾶλλον. ἐν δὲ τοῖς πνευματώδεσι καὶ ψυχροῖς καὶ τῇ φυτεῖα μανῇ ἀναυξέστερα μὲν, πυκνότερα δὲ καὶ ξηρότερα. συνίστησι γὰρ τὰ πνεύματα καὶ τὰ ψύχη καὶ ὅλως ὁ προσπίπτων ἀήρ. ἅμα δὲ καὶ συστέλλεται καὶ οὐ λαμβάνει τὸν ἴσον ὄγκον. ὡσαύτως δὲ ὅταν ἡ φυτεία μανῇ· καὶ γὰρ ἐνταῦθα πυκνότερα καὶ εἰς βάθος αὐξανόμενα μᾶλλον, ἐν δὲ ταῖς πυκναῖς ἀνάπαλιν. (4) φανερόν δὲ καὶ ἐπὶ τῶν ἄλλων ζώων τοῦτο συμβαῖνον καὶ μάλιστα ἐπὶ τῶν ἀνθρώπων· εὐαυξέστερα γὰρ τὰ θήλεα τῶν ἀρρένων, ὑγρότερα καὶ μανότερα τὴν φύσιν ὄντα. δῆλον δὲ καὶ ἐπ' αὐτῶν τῶν δένδρων· ῥόα μὲν γὰρ καὶ συκῇ καὶ ἄμπελος εὐαυξῇ, φοῖνιξ δὲ καὶ κυπάριττος καὶ δάφνη καὶ πεύκη καὶ ἑλάα δυσάυξη. καίτοι τό γ' εὐθυπορεῖν ὑπάρχει τισί

suspiciabatur Sch. | ἔμπυρον U etc.; ἔμπηρον conj. Sch-comm et cur-sec e mrg-Vsc (i. e. verbum quod "*Hesychius* ἀνέροχον *interpretatur*" Sch.) | θατέρου δ' ἐν ὀλίγῳ Mld mrg-Vsc (qui deinceps πολλὴν habent);—δὲ ἐν et πολλὴ praetulit Sch; θάτερον δὲ ὀλίγον μὲν πολλῶ A Scl (et U sed πολλῶν in πολλῶ erasum); θάτερον δὲ ὀλίγῳ μὲν πολὺ Hns. | μανότης Wmr sine nota in conspectu; ὑγρότης U A Scl Hns Sch; *humiditas* G.

3. καὶ τὸ κατὰ A Hns; καὶ κατὰ U Scl. | καὶ κατὰ τὰς φυτ. Scl. | φοιτείας U (in φυτείας erasum). | εὐδιεινοῖς U A etc.; *serenis* G (pro εὐδίοις?). | ἔτι δὲ ὅταν Sch; ἔτι δ' ὅταν U A Hns. | ἔτι δὲ . . . φυτεία πυκνὴ et deinceps καὶ τῇ φυτεῖα μανῇ spuria credit Sch-com (cum Lnk). | ποικνῇ (in πυκνῇ erasum)—εὐαυξῇ—φοιτεῖται (in φυτ. erasum) U. | ψύχη καὶ U Hns; καὶ om. A; et omnino aer G. | ἅμα δὲ καὶ συστ. U A Hns; Sch autem his verbis utitur: "*Copulam tertio loco inseruit nescio unde Heinsius.*" (Num Schneiderus Aldinam primam vidit?) | συνίστησι . . . ὄγκον: *constipat materiem; atque coagit; unde contractiores quoque redduntur arbores; neque mollem (sic) eandem possunt capessere* G. | ἴσον Scl. | ὡσαύτως δὲ καὶ Scl solus; *Idem etiam sequitur cum* G. | φοιτεία (etc. ut fit)—αὐξαινόμενα (-ei-erasum)—ἀνάπωλιν U.

4. φανερόν U (et ante Ms. repert. Sch-com); φανερῶς A Scl Hns Sch-txt. | ἐπὶ τῶν ἄλλων ζώων U A Hns; aut ἄλλων delendum aut ζώντων scribendum cens. Scl; *uidere hoc idem et in animalium genere licet* G. | εὐαυξέστερα A Hns; εὐαυξέστατα U M; *facilius . . . augescunt* G. | δῆλον δὲ καὶ U M; δῆλον δὲ ὅτι καὶ

or whether it is rather the case simply in all those that are less dense and more moist. The compact and dry are of difficult growth, since everything that is dense and dry and brittle has elemental fire² in its nature, so that its giving up of nourishment is slow. Of the other sort, the porous and moist, there is much giving up of nourishment, and that in a short time because of their open structure. In general, openness of structure is a help to growth and nutrition.

There is significance, too, in how they react to their environment³ and modes of planting; for in sheltered and still places and in close planting the trees grow up readily, tending to be porous and moist. In windy and cold places however, and with more open planting, not only are the trees of smaller growth, but the wood is denser and drier; for windy and cold weather and atmospheric action in general tend to condense them and at the same time reduce them in height, so that they do not attain their wonted bulk. The same thing is true whenever they are planted far apart; for here again they are denser in wood and rather deeper in growth.⁴ In close planting the opposite is the case.

This is seen to occur also in the case of animals as well as plants, and especially in man. For the females, being naturally moister and softer,⁵ grow more rapidly than the males.⁶ This is clear too in trees themselves; for the pomegranate, fig, and vine are rapid growers, while palm, cypress, laurel, fir, and olive are slower. Some of these latter, however, have straight passages;⁷ but either their density or dryness or both⁸ hinder them, dry-

² And so is opposed to nutriment, which is of the "moist." (The reading "bitter," if right, must be simply for fullness, without specific reference to plants. It is simply another instance of the "fiery" nature; for surely, if Th. ever tasted growing buds, he must have found some of them bitter enough.)

³ H. 1. 9. 1, 2; C. 1. 13. 8; C. 3. 6. 8, 9; C. 6. 18. 9.

⁴ Th. seems to mean—as G takes it though not Wimmer—that the growth is more toward, and in, the roots; naturally so for better resistance to the greater stress of the forces of nature.

⁵ Lit. less dense.

⁶ Varro R. R. 1. 41. 4, 5.

⁷ H. 1. 5. 5; C. 2. 11. 8; C. 5. 17. 3.

⁸ "A ridiculous addition" says Scaliger. Th. might, however, conceivably mean that a combination was necessary in some plants, whereas either factor might be effective in others.

τούτων, ἀλλ' ἤτοι πυκνότης ἢ ξηρότης ἢ ἄμφω κωλύει· καὶ γὰρ ἡ ξηρότης ἀναυξής. ἔτι δὲ πρὸς τοῦτοις ἔνια <ὑπὸ> τῆς ἀσθενείας· καὶ γὰρ τοιαῦτα δυσανξὴ καὶ δύστροφα. δεῖ γὰρ μὴ κρατεῖσθαι μηδὲ κωλύεσθαι τὴν τροφήν ὑπὸ τοῦ περιέχοντος· ἐπεὶ καὶ τὸ εὐθυπορεῖν προσδέεται δυνάμει καὶ τῆς κατεργαστικῆς καὶ τῆς ἀπαθοῦς· ἄλλως δ' οὐδὲν ὄφελος. εὐανξὴ μὲν οὖν καὶ δυσανξὴ τοῖς τοιοῦτοις ἀφοριστέον.

IX. "Ἀπαντα δὲ χεῖρω τὰ ἐκ σπέρματος ὡς ἐπὶ πᾶν ἔν γε τοῖς ἡμέροις οἷον ρόα συκῇ ἄμπελος ἀμυγδαλῇ. καὶ γὰρ ὅλως <τὰ> γένη μεταβάλλει καὶ ἐξαγριοῦται πολλάκις ἔνια, καθάπερ ἐν ταῖς ἱστορίαις εἴρηται.

τοῦτου δ' αἴτιον ἡ ἀσθένεια τῶν σπερμάτων. κρατεῖται γὰρ ὑπὸ τῆς ἐπιρροῆς πλείονος οὔσης· καὶ ὥσπερ ἄκαρπα γίνεται διὰ πλῆθος τροφῆς οὐ δυνάμενα πέττειν οὕτως καὶ χεῖρω γίνεται διὰ τὸ μὴ κρατεῖν. καὶ διὰ τοῦτο θάσιοι τὰς ἀμυγδαλὰς ὅταν προσανξηθῶσιν ἐνοφθαλμίζουσιν· ἐκ γὰρ μαλακῶν σκληραὶ γίνονται μετὰ τὴν φυτείαν· εἴη δ' ἂν τοῦτο καὶ ἐπὶ τῶν ἄλλων ποιεῖν.

A Hns. | ρόα μὲν γὰρ καὶ Sch e G: *punica enim est*; (prave autem in Auct. Schneider dicit Urbinatem γὰρ legere); ρόα μὲν καὶ U A Hns. | εὐαξῇ — φοίνιξ U. | καίτοιγ' (το super ιγ prima manu scriptum) U; γ' om. A Scl Hns Sch-txt. | ἔνια <ὑπὸ> Hns (cum Scl: "*deest praepositio χάριν aut ὑπὸ*" 34. 2. D.); ὑπὸ om. U A; ἔνια ἀσθενεί (sic) mrg-Vsc. | ἀσθενείας U. | τροφήν conj. Wmr; κράδην U A Scl Hns; *ramos* G. | ἄλλως δ' οὐδὲν Sch (cum Scl: "*alius dixisset, ἄλλως οὐδὲν et δ' e mrg-Vsc*); ἀλλ' ὅμως οὐδὲν U A Scl Hns. | ὄφελος (in ὄφ-erasum) — εὐαξῇ U.

1. ὡς ἐπὶ πᾶν U; ὡς ἐπίπαν A Scl Hns Sch-txt; "*quod alias ὡς εἰπεῖν*" Scl; *fere* G. | ἔν γε corr. Scl; ἔν τε U M; ἐν δὲ A; *inter satina* G. | ὅλως <τὰ> γένη Wmr; ὅλα γένη U A Scl Hns Sch; καὶ . . . γένη κτλ. vitiosa suspicatur Sch. | ἐξαγριοῦται corr. Wmr; ἐκπαπποῦται U A Scl Hns Sch ("*vitiosum*" Sch); *degenerant enim: et saepe raro dicta lanugine uiciantur* G. | πλείονος οὔσης U A Scl Hns; *ab inflexu copiosioris alimenti* G, unde τροφῆς Hfm pro οὔσης scribendum censet. | πλῆθος τῆς τροφῆς Scl. | πέττειν: *degerere* (male) G. | οὕτως U M; οὕτω A Hns Sch-txt. | διὰ τοῦτο θάσιοι U M A Hns Wmr; δ. τ. <οἱ> θάσιοι Sch-txt solus; διὸ καὶ Θ. Scl. | προσανξηθῶσιν U A Scl; προσαυξῶσιν A-Bas (ap. Sch); "*scribe προσανξηθῶσιν, non autem, ut legitur, inutile.*" Scl 37. 1. C. (Iterum miror utrum Scl editionem principem viderit.); *amygdalas adultas* G (simplicius). | μετὰ τὴν φυτείαν post ἐνοφθαλμίζουσι collacanda suspicatur Sch-ann; *adultas inoculant. Ex mollibus enim perduræ post satum redduntur* G.

ness too being hostile to growth. Furthermore some also find it difficult to grow and get nutriment because of their feebleness. For nourishment must not be withheld or hindered by the surrounding conditions, since even a plant with straight passages needs also the faculty of manufacturing its food, as it also needs a certain resistance; otherwise it is at a great disadvantage. In some such way, then, we are to distinguish ease and difficulty of growth.

IX

All that are produced from seeds are almost universally inferior; at least so it is in cultivated plants such as pomegranate, fig, vine, and almond. These in fact generally change their natures, some even going back to the wild, as was related in the *Historia*.¹ The cause of this is the weakness of their seeds; for they are overcome by a too copious influx of nutriment and become, as it were, sterile because of the quantity of food which they are not able to assimilate, thus becoming inferior because of their inability to master it. That is why the Thasians "bud" the almond² trees when they grow too fast, for they change from soft to hard after the "planting."³ This treatment⁴ would probably prove feasible also in other trees.

Such seeds as are strong last longer, for instance those of the date palm, the so-called "cone-bearing pine,"⁵ and the "lice-bearing fir."⁶ In the same manner also must we regard

¹ On this section in general, see H. 2. 2. 4. ff.

² A remark which would tend to correct the generally received opinion that Thasos was an island of barren soil, whose only product was the vine. Cf. Smith-Marindin *s. v. Thasos*; H. 9. 18. 11; Plin. *N.H.* 14: 117 (22); Archil. 21 (Bergk: *Anh. Lyr.*)

³ Probably budding; the graftage helps to use up the excess nutriment. Cf. Arist. *G. A.* 1: 18 (725 b. *fin.* and 726 a *init.*)

⁴ For other cures, see H. 2. 7. 6.

⁵ Stone pine (*Pinus pinea*, Th-Dyer); H. 2. 2. 6.

⁶ *Pinus brutia*, Th-Dyer. On fir *vs.* pine, see H. 3. 9. 4.

(2) ὅσα δ' ἰσχυρὰ τῶν σπερματικῶν ταῦτα διαμένει μᾶλλον ὥσπερ ὁ τε φοῖνιξ καὶ πείκη ἢ κωνοφόρος καλουμένη καὶ πίτυς ἢ φθειροφόρος.

ὡσαύτως δὲ καὶ τὰ τῶν ἀγρίων ἴσως δ' οὐκ ἔχει ταῦτά γε μετάβασιν εἰς τὸ χεῖρον· ἢ γὰρ ἀγριότης ἔσχατον. ἀλλ' ἢ εὐχυλία καὶ ἡ εὐσαρκία τούτων πρὸς ἄλληλα γίνεται διὰ τὸν ἀέρα καὶ ἀπλῶς τοὺς τόπους. ἐπεὶ καὶ τὰ ἡμέρα εἰς τοῦτο διαφέρει· δύνανται γάρ τινες χώραι διατηρεῖν τὰς φύσεις, αἱ μὲν μέχρι τινός, αἱ δ' ἀπλῶς· αἱ δὲ καὶ μεθίσταναι πρὸς τὸ βέλτιον καθάπερ εἴρηται περὶ τε τῶν ἐν Αἰγύπτῳ καὶ ἐν Κιλικίᾳ ῥοῶν· αἱ μὲν γὰρ γλυκεῖαι καὶ οἰνώδεις, αἱ δ' ἀπύρνηοι καὶ καλλίκοκοι γίνονται περὶ τὸν Πίναρον ποταμὸν.

(3) ἀπλῶς δ' ὅταν οἰκείαν χώραν λάβωσιν οἱ καρποὶ μᾶλλον δύνανται τὰ γένη διατηρεῖν ὅταν μάλιστα εὐσθενῇ καὶ καλλικαρπῇ τὰ δένδρα. ἐν δὲ τοῖς ἐπετείοις σπέρμασι πανταχοῦ πρὸς τὴν χώραν ἢ μεταβολὴ γίνεται πλὴν οὐκ εὐθὺς σπαρέντων, ὀλίγος γὰρ ὁ ἐν τῇ γῇ χρόνος, ἀλλὰ τρίτῳ δὴ ἔτει· τότε γὰρ ἀλλοιοῦνται πρὸς τὴν ἐκτελείωσιν ὥσπερ καὶ τὰ ζῶα. καὶ γὰρ ταῦτα τριγωνήσαντα συνεξομοιοῦνται οὐ μὴν ἀλλ' ἐπίδηλόν γέ τι ποιεῖ καὶ ὁ πρῶτος ἐνιαυτός. καὶ τὰ μὲν ἐκ τῶν σπερμάτων χεῖρω διὰ ταύτας τὰς αἰτίας.

X. Ἡ δ' ἐπέτειος βλάστησις, αὕτη γὰρ οἷον δευτέρα γένεσις ἐστίν, οὐχ ἅμα γίνεται πᾶσιν ἀλλὰ παραλλάτει ταῖς ὥραις, ὥστε σχεδὸν ἐν ταῖς ἐναντίασι ἐνίων εἶναι καὶ τὰ μὲν θέρους τὰ δὲ χειμῶνος βλαστάνειν.

2. ὅσα δ' Wmr. | σπερματικῶν U A Hns; *quae seri semine possunt* G; σπερμάτων Sch ("oppositum membrum σπερμάτων postulat." Sch-ann) Wmr. (Quare postulet nescio; censeo etiam ἐκ ante σπερμάτων addendum fore.) | κατὰ τῶν ἀγρίων habere videtur U. | ἴσως δ' οὐκ A; ἴσως οὐκ U M; *ni forte nulla* G. | τὸ ἔσχατον Scl. | εὐσαρκία Scl; συσαρκία U M; συσσ. A; *bonitas succi; carnisque* G; *δυσσαρκία* scribendum? | πρὸς ἄλληλα γίνεται om. G; in sequentia (εἰς τοῦτο πρὸς ἄλληλα) transferre vult Sch; *ea ipsa inter se differunt ratione* G. | μεθίσταναι corr. Sch-syl; μεθίστανται U A Hns. | Κιλικίᾳ corr. Scl (G: *Ciliciae*); κοιλίαι (ἀ in margine ante x-scriptum) U; ἀκυλίᾳ M A. | τοῦ πίναρον M.

3. ὅταν μάλιστα' A Hns Wmr; ὅτ. μάλισθ' U; μάλισθ' ὅταν Sch-txt (e G: *praecipue si arbores uigent: fructumque laudatum praestare suapte natura pollent.*) | ἐπετείοις A Scl Hns; ἐπέτειος U. | τριγωνήσαντα U A Hns; τριτογωνήσαντα Scl (37. 1. A-B).

1. οὐχ ἅμα Scl; οὐκ (*sic*) ἅμα A Hns; καὶ οὐχ ἅμα U M; *non simul* G. | παραλλάττει κτλ.: *tempore discrepat* G. | βλαστάνειν U Hns; βλαστάνει A (et

the seeds of wild trees; though perhaps these suffer no change for the worse, for wild nature is an enduring thing.⁷ The differences in their quality of sap and of timber⁸ are caused by their differences in climatic condition and location; for even cultivated trees differ from one another in that particular. There are certain sites that are able to preserve the tree's character—some partly, others absolutely. Some trees also are changed for the better as was said of pomegranates when planted in Egypt and Cilicia; for in the former land they are sweet and wine-flavored,⁹ and in the latter those which grow about the river Pinarus¹⁰ are stoneless¹¹ and have delicious pulp.

In brief, whenever fruit trees get the proper sort of situation they can better preserve their type, especially when they are vigorous and fine-fruited. In annuals seeds everywhere undergo change according to their situation, except those just sown (for their time in the soil is too short). In the third year,¹² however, the change can be observed, for it then reaches completion (as is also the case in animals, for these, too, in the third generation have made all the adaptations¹³ to environment of which they are capable). This, however, does not mean that no change is evident also in the first year. It is for these reasons, then, that growth from seeds is inferior.

X

Annual budding¹—which is really a sort of second generation—does not take place in all at the same time, but differs so in time

⁷ Or, is as bad as possible to begin with (and so cannot deteriorate).

⁸ Lit. flesh.

⁹ Plin. *N. H.* 23: 106 (57).

¹⁰ The site of the battle between Alexander and Darius (cf. Strabo 14. 5. 19); perhaps this was a yarn reported to Th. by one of Alexander's returned veterans; cf. H. 2. 2. 7.

¹¹ Plin. *N. H.* 13: 112 (34).

¹² C. 2. 13. 3.

¹³ C. 4. 11. 5.

¹ See H. 3. Chap. 4; H. 5. 1. 3, 4; C. 3. 11. 6.

ὁμοίως δὲ καὶ ἡ καρπογονία· καὶ γὰρ αὕτη διέστηκε τοῖς χρόνοις. ὥς μὲν οὖν ἀπλῶς εἰπεῖν, τὰ πρὸς ἐκάστην ὥραν σύμμετρον ἔχοντα τὴν κρᾶσιν ταῦτα καὶ τὰς βλαστήσεις ἐν ἐκάστη καὶ τὰς τελεώσεις τῶν καρπῶν ἀποδίδωσιν.

(2) οὐ μὴν ἀλλὰ δεῖ καὶ τοῖς καθέκαστα πειρᾶσθαι διαιρεῖν· ἓνια μὲν γὰρ εὐβλαστῇ καὶ ἡ βλάστησις δι' ἰσχὺν καὶ πολυτροφίαν ὥσπερ ἀμυγδαλῇ ροιά, καὶ ὅλως τὰ ἄγρια μᾶλλον τῶν ἡμέρων· ἓνια δὲ δι' ἀσθένειαν ὥσπερ τὰ ποιῶδη καὶ ἐπέτεια. καὶ γὰρ ἀνθεῖ πολλά τούτων κατὰ χειμῶνα καθάπερ καὶ ἡ ἀνεμώνη· φαίνεται δὲ οὐδ' ἡ μηλέα πρωϊανθεῖν δι' ἰσχὺν, ἀλλὰ δι' ἄλλην αἰτίαν. ἐκατέρα δ' εὐλόγως πρωῒβλαστεῖ καὶ τὰ ἰσχυρὰ καὶ τὰ ἀσθενῆ· τὰ μὲν γὰρ τῇ δυνάμει καὶ τῷ πλήθει προωθεῖ, τὰ δὲ ὑπὸ μικρῶν εὐκίνητα τῶν κατὰ τὸν ἀέρα.

(3) μέγα δὲ καὶ ὑγρότης καὶ μαλακότης εἰς τὸ προῖεναι ὥσπερ καὶ ἐπὶ τῆς πρώτης φύσεως ἐλέχθη· τὸ γὰρ ξηρὸν καὶ πυκνὸν οὐτ' εὐδίοδον ὁμοίως οὐθ' ὕλης ἔχει πληθός. ὅσα δὲ ἐν ταῖς ἐναντίαις ὥραις ἐκβλαστάνει τούτων αἰτιῶνται τινες τὴν ψυχρότητα καὶ θερμότητα· τὰ μὲν <γὰρ> ψυχρὰ τοῦ θέρους τὰ δὲ θερμὰ τοῦ χειμῶνος βλαστάνειν, ὥστε ἐκατέραν τὴν φύσιν σύμμετρον εἶναι πρὸς ἐκατέραν τῶν ὥρῶν. οὕτω γὰρ οἶεται καὶ Κλείδῆμος· οὐ κακῶς μὲν οὖν ἴσως οὐδὲ τοῦτο λέγεται, δεῖ δὲ καὶ τὴν ὀλιγότητα καὶ τὴν ἀσθένειαν καὶ εἴ τι ἄλλο συναίτιον προστιθεῖν καθάπερ καὶ ἐπὶ τῶν λαχανωδῶν ὀρώμεν.

G: *germinare incipiunt*). | τοῖς χρόνοις U A etc.; τοῖς om. M. | κρᾶσιν A Scl Hns; κράτησιν (-τη-eraso) U.

2. καθέκαστα Wmr (et rec. man. ap. U); καθ' ἕκ. U A Scl Hns Sch-txt. | καὶ ἡ βλάστησις om. G. | μᾶλλον τῶν ἡμέρων U M Sch; τῶν ἡμ. μᾶλ. A Scl. | ποιῶδη M. | ἀνθῇ (in-ei rec. manu mutatum) U. | πολλά τούτων U et Sch (cum G et Mld) ante Ms. repertum; πολλὰ τοῖς τῶν A Scl Hns; *complura enim ex his* G. | μιλία U (in μηλέα correctum). | πρωϊανθεῖν conj. Wmr; προανθεῖν U A Scl Hns Sch Wmr; *prae florere* G. | ἀλλὰ δι' ἄλλην U M Sch; ἀλλ' ἄλλην A Scl Hns; *sed ob aliam potius causam* G. | πρωῒβλαστῇ (rec. man.-ei) U; *Festinant* G. | καὶ ἰσχυρὰ Hns solus. | κατὰ τῶν ἀέρα Wmr-Tbn solus (mendum).

3. καὶ ὑγρότης καὶ μαλακότης M; κ. ὑγ. κ. ἡ μαλ. U; κ. ἡ ὑγ. κ. ἡ μαλ. A Scl; —μαρότης Sch (cum mrg-Vsc "*propter oppositum πυκνότης*"); —mollicies G. | ψυχρότητα Sch cum mrg-Vsc et Mld; ὑγρότητα U A Hns; *humiditate* G. | τὰ μὲν <γὰρ> Sch cum G (*frigida enim*) et mrg-Vsc; γὰρ om. U A Hns. | ὀρῶν (ὥ-rec. man.) U. | Κλείδῆμος U A; Κλειδίμος M; *Clidimus* G. | ὀλιγότητα: deesse ὑγρότητος susp. Sch. | τὴν ἀσθένειαν Wmr; τὴν om. U A Scl Hns Sch. | ὀρώμεν om. G.

that certain plants put forth their leaves at seasons that are practically the opposite of each other: some in summer, some in winter. The same thing is true of fruit-bearing, for this also takes place at different times. To make a general statement: those that agree in temperament² with the various seasons produce in their respective seasons their growth and the maturing of their fruits.

Still we should make an attempt to distinguish the characteristic features of each; for some bud early, which activity comes about because they are hardy and amply nourished, as in almond and pomegranate, and on the whole in wild, rather than in cultivated trees. Some, on the other hand, bud early because of their tenderness, for example the herbs³ and annuals; for in fact many of these, like the anemone, flower in winter. It would seem that it is not because of its strength that even the apple blooms early, but for another reason. It is possible to explain why both sorts, the strong as well as the weak, are early growers. For the first spring forth because they are strong and full of nourishment, and the others because they are easily influenced by even small changes in the air.

Moisture, too, and softness⁴ contribute greatly to early growth, as was said in the case of the original growing of the plant; for neither are the dry and dense so very permeable, nor have they a great amount of "stuff."⁵ The reason why certain of them bud forth at contrary seasons has by some persons been assigned to their coldness or warmth; for they cite the fact that cold plants come out in summer while the warm come out in winter so that the peculiar individual nature corresponds to the particular season. This is the opinion, for instance, of Cleidemus.⁶ Now perhaps that too is not a bad way of stating the matter; but still we ought also to consider insufficiency and weakness and any other associated cause, just as we see them in the case of garden herbs.

² Lit.: mixture.

³ H. 7. Chap. 1.

⁴ Sch. would read: porousness.

⁵ The Aristotelian concept, "matter," that which is capable of receiving "form"; cf. Arist. *Met.* 6. 7. 2; 6. 10. 4; 7. 1. 6.

⁶ H. 3. 1. 4; C. 3. 23. 1.

(4) ἡ μὲν γὰρ ἀνδράχην καὶ ὁ σίκυος καὶ ὅλως τὰ τοιαῦτα κάθυγρα καὶ ψυχρά· τὸ δ' ὤκιμον ξηρόν καὶ ξυλῶδες· ἀλλ' ὅμως οὐ δύναται πρὸ τῶν θερμημεριῶν βλαστάνειν εἰς γε διαμονὴν καὶ τελέωσιν· αἴτιον δὲ ἡ ἀσθένεια καθάπερ καὶ τῆς σικύας καλουμένης. αὕτη μὲν γὰρ δένδρου ὕψος λαμβάνουσα καὶ σχιζομένη τοῖς κλωσὶν ὥσπερ ἡ ἀναδενδράς ὅμως ἐπὶ κηρόν τε καὶ οὐ δύναται πρὸ τῶν θερινῶν ἀλλὰ δεῖται πορρωτέρω τῆς ὥρας παρατείνειν πρὸς τὸ μετόπωρον.

(5) καὶ τὰ ἀκανθώδη καὶ ποιῶδη καὶ ριζοκέφαλα καθάπερ ὃ τε σκορπίος καλούμενος καὶ τὰ τίφυα καὶ ἡ ἄκανθα βασιλικὴ καὶ τὸ λείριον, ἔνια δὲ καὶ μετ' ἀρκιτοῦρον. εἴτε οὖν ὕστερα χρῆ καὶ ὀψιαίτερα ταῦτα λέγειν, εἴτε καὶ πρωϊαίτερα, γινομένων τῶν πρώτων ὑδάτων, οὐδὲν γὰρ διαφέρει πρὸς γε τὸ νῦν ἀλλ' ἐκεῖνο φανερόν ὡς οὔτε μεγέθει καὶ μικρότητι τὸ πρωῒβλαστὲς καὶ ὀψιβλαστὲς ἀφοριστέον οὔτ' ἴσως θερμότητι καὶ ψυχρότητι καὶ ὑγρότητι καὶ ξηρότητι μόνον, ἀλλὰ δεῖ τινα συμμετρίαν ἕκαστον ἔχειν πρὸς τὴν ὥραν. [γίνεται γὰρ ἀπαλωτάτη.]

(6) φαίνεται γὰρ ἅπαντα τὴν οἰκίαν ἀναμένειν τελέωσιν, ἀβλαστῇ τε τέως καὶ ἀκίνητα ὄντα ὁμοίως δένδρα καὶ ὑλήματα καὶ ποιῶδη· φανερώτατον γὰρ τοῦτ' ἐν τοῖς ἀγρίοις ἐν οἷς δὴ καὶ ἡ γένεσις αὐτοφυῆς καὶ ἄνευ παρασκευῆς. πάντα δ' ὡς εἰπεῖν ἢ τὰ γε πλεῖστα τῶν μετοπωρινῶν

4. ὀρώμεν. ἡ μὲν γὰρ ἀνδράχην . . . σίκυος A Hns;—σίκυος Sch; ὀρωμένη μὲν γὰρ ἀνδράχλη . . . σίκυμος U M; *portulaca* . . . *cucumis* G Scl. | δύναται U M; δύνανται A Hns Sch-txt; *ualet* (i. e. *ocimum*) G; ("Pertinet verbum ad duo contraria exempla plantarum oleacearum." Sch.) | τελέωσιν U; τελείωσιν A Scl Hns Sch. | αἴτιον δὲ ἡ U A Scl Hns; | αἴτ. δ' ἡ Sch Wmr. | τῆς ὥρας Sch; ταῖς ὥραις U A Scl Hns; πορρ. τ. ὥρ. om. G.

5. τὰ ἀκανθώδη: *quae iaculeis* (*aculeis* ap. Hns) *constant* G. | καὶ ποιῶδη U; ὀπιῶδη M; om. G; *propter plantas inde nominatas suspicatus est* Sch. | εἴτε οὖν . . . πρωϊαίτερα, γινομένων . . . ὑδάτων U A Scl Hns; γιν. . . ἰδ., εἴτε οὖν . . . πρωῒαιτ. Sch-txt. | ὀψιέτερα (-αιτ-rec. man.) U. | πρὸς γε A Scl Hns; πρὸς τε U M. | μικρότητι U M; σμικ. A Hns Sch-txt. | οὐθ' ἴσως U. | <καὶ ψυχρότητι> add. Sch de suo. | ἀλλὰ . . . ἀπαλωτάτη: *sed modum quendam temporis congruentem habeat unumquidque opus est: ut tenerrima effici possint.* G. | [γίνεται . . . ἀπαλωτάτη] *notavit* Wmr *cum suspicione* Sch.

6. ἀβλαστῇ τε τέως conj. Sch ("duce G."); τὰ δὲ καὶ βλαστῇ τελέως δὲ U M et βλαστάνει pro βλαστῇ A Hns. | ἀναμένειν <ὥραν πρὸς τὴν> τελείωσιν Sch-txt; *nec* (*Haec* ap. Hns) *prius germen nullum* (*ullum* ap. Hns) *effundunt sed*

For purslane and cucumber and such plants in general are very moist and cold, while basil is dry and woody. Still they cannot bud before warm weather, at least not so as to last and come to maturity. The reason is their weakness, just as in the case of the so-called *sikya* (bottle gourd), which, while attaining to the height of a tree,⁷ and being branched like the "tree-vine,"⁸ still is perishable and cannot bud before summer, but likes to delay its budding even further in the season toward autumn; as do the plants that are spinous and herbaceous, and whose flowers spring straight from the root, as the so-called *skorprios*,⁹ and the autumn squill¹⁰ and royal thorn¹¹ and lily.¹² Some wait even until after the rising of Arcturus.¹³ Whether then we should call these late growing plants, or whether we should speak of them as advanced early growers, since the first rains precede them (for, in the present consideration at least, this makes no difference)—this, in any case, is clear: that their early or late growing is not to be explained in terms of their large or small size, nor probably in terms of their warmth, moisture, or dryness alone; but the fact is that each must show some sympathetic reaction to the particular season of the year concerned, because that season is kindest to it.

For apparently all of them await their own season of perfection,¹⁴ showing up to that time no sign of life or activity, trees and shrubs and herbs alike. This is most clearly seen in the wild plants,¹⁵ in which too germination is self-incited and unaided by art.¹⁶ We might say that all, or nearly all, of the autumnal growers are found among the shrubs or half-shrubs¹⁷ or herbs, since no tree buds at that season except when occa-

⁷ C. 2. 18. 2; and see the long section in Sch., Vol. 4, pp. 40-42.

⁸ A suggested rendering for *anadendras*.

⁹ Probably a broom (? *Genista acanthoclada*); cf. H. 6. 1. 3; H. 6. 4. 1.

¹⁰ H. 7. 13. 7.

¹¹ A literal rendering of the Greek.

¹² See H. 6. 6. 9.

¹³ Mid-September.

¹⁴ H. 3. 5. 4.

¹⁵ H. 3. 2. 1.

¹⁶ C. 1. 12. 4; C. 1. 13. 3, 5.

¹⁷ H. 1. 1. 1.

ἐν τοῖς ὑλήμασι καὶ τοῖς φρυγανικοῖς καὶ ποιώδεσιν ἔστιν· ἐπὶ δένδρον γε οὐδὲν πλὴν εἰ μὴ τι κατὰ τὴν ἐπιβλάστησιν· ἐπιβλαστάνει γὰρ ἕνια μετ' ἀρκτοῦρον.

(7) ὥς δ' ἐπὶ πᾶν καὶ καθόλου λαβεῖν τὰ ἀειφύλλα τῶν δένδρων καὶ ὀψι-βλαστότερα καὶ ὀψικαρπότερα διὰ τε πυκνότητα καὶ ξηρότητα, κατὰ μικρὸν γὰρ ἢ ἐπιρροή, καὶ διὰ τὸ συνεχές αἰετῆς εἰς τὰ φύλλα διδομένης τροφῆς· οὐ γίνεται γὰρ ἀθροισμός ὥστε προορμᾶν, ἀλλ' ἀπὸ τῆς ὥρας κινεῖται τῆς οἰκείας τὸ καθήκον. σπάνια γὰρ ἂν τις λάβοι τὰ πρωῒβλαστῆ καὶ πρωῒκαρπα τῶν ἀειφύλλων οἷον τὸν τε κιττὸν καὶ τὴν ῥάμνον καὶ εἰ τι τοιοῦτον. ἡ δὲ ἰδιότης εἴτε διὰ θερμότητα τούτων εἴτε καὶ μανότητα καὶ ὑγρότητα εἴτε καὶ διὰ ταύτας πάσας συμβαίνει τὰς αἰτίας διαιρετέον αὐτὸ τοῦτο πρῶτον ἴσως εἰπόντας ποῖα θερμὰ καὶ ποῖα ψυχρὰ καὶ τοῖς ποίοις ληπτέον. ἀλλὰ περὶ μὲν τούτων ἐν τοῖς ὕστερον πειρατέον εἰπεῖν· διὰ τί δὲ τὰ μὲν πρωῒβλαστῆ, τὰ δὲ ὀψιβλαστῆ ταύτας ἂν τις ἀποδοίη τὰς αἰτίας.

XI. "Ὅσα δὲ κατὰ πᾶσαν ὥραν βλαστάνει τε καὶ ἀνθεῖ καὶ καρποτοκεῖ καθάπερ ἡ περσικὴ μηλέα καὶ εἴ τι ἄλλο τοιοῦτον ἀπορήσειεν ἂν τις οὐ μόνον ὅτι οὐ πρὸς πάσας ἀρμόττει τὰς ὥρας ἢ κρᾶσις, ἀλλ' ὅτι

penitus sibi immota pariter arbores . . . constant. G. | ποιώδεσιν U; πρῶδεσιν (mend.) Hns.

7. μικρὸν γὰρ U A Hns; γὰρ om. M; *Paulatim enim* G. | διδομένης U A Scl Hns; ἀναδιδομένης Sch-txt. | καὶ διὰ . . . τροφῆς: *adde eam partem alimenti quae foliis assidue uenit* G. | γίνεται γὰρ U M; γίν. δὲ A Scl ("τὸ δὲ hic est οὖν," Scl 41. 2. C.); *Hinc enim* G. | προορμᾶν U M; παρορμᾶν A Scl Hns. | τὸ καθήκον susp. Sch.; καθήκαν U. | οὐ γίνεται . . . καθήκον: *Hinc enim collectus quo arbores otius (ocys ap. Hns) cogantur turgescere: nullus fieri potest: sed suo tantummodo tempore quoad liceat commouentur.* G. | πρωῒκαρπα A; πρωῒκαρπα U. | εἴτε καὶ μανότητα U M; καὶ om. A Hns. | συμβαίνει τὰς αἰτίας U M; τ. α. συμ. A Hns. | αὐτὸ* (*τοῦτο in marg.) U. | αὐτὸ . . . εἰπόντας: *Illo tamen prius non ab re fortasse exposito* G.

1. Περσικὴ: Μηδικὴ mrg-Vsc; *malopersica* G. | ὅτι οὐ A; ὁ U M; *non solum quoniam* G. | κρᾶσις U (passim). | αὐτὰ αὐτοῖς corr. Scl; αὐτ. αὐτ. A Sch; *ipsa inter se* G; αὐτὰ om. Hns. | ὁμοβλαστάνει U M Sch; ὁμοιοβλαστάνει A Scl Hns. | ὁμοκαρπεῖ corr. Sch; ὁμοιοκ. U M A Scl Hns; (ὁμοιοβλαστῆ in mrg-Vsc, quod etiam ὁμοιόκαρπα postulare.) | *quia nec ipsa genera inter sese germinis: aut fructus ratione conueniant.* G. | τοῦτο γὰρ . . . συμβαῖνον:

sionally super-budding¹⁸ takes place after the rise of Arcturus.

Now, in general, and to take a universal view, one might say that of trees the evergreens¹⁹ are both the latest to bud and the latest to fruit²⁰ because of their solidity and dryness (for their flow of sap is gradual) and because of the continued supply of food²¹ being given to the old leaves; for there is no collecting of sap so that they can advance with a leap, as it were, but at their proper season they grow the regular amount. For one would find among the evergreens few that are early growing and early fruiting like ivy,²² buckthorn, and the like. Whether the peculiarity occurs because of their warmth or their porousness and moisture, or again because of all these reasons, we should perhaps first determine. We should therefore tell by what sorts of heat and cold and by what signs they can be distinguished. About these things, however, we must attempt to speak later; but to explain why some bud earlier and others later one might give the reasons mentioned above.

XI

Now concerning those which grow and flower and fruit at all seasons such as citron¹ and the like, one might be at a loss, not only because their temperament is suited for all the seasons, but because not even all trees of the same kind always bud and bear at the same time. For in individuals separated from their kind we expect this phenomenon, and we actually see it too.

¹⁸ C. 1. 13. 10.

¹⁹ H. 1. 9. 3, 4, etc.; C. 1. 17. 6. Of course many trees deciduous in our climate are evergreen in the Mediterranean region.

²⁰ C. 1. 22. 4.

²¹ H. 1. 9. 7; C. 1. 13. 2; C. 1. 21. 7; C. 2. 17. 2; C. 2. 18. 1.

²² C. 1. 21. 7.

¹ Cf. H. 4. 4. 1-3, on which see DeCandolle, pp. 180 and 221, English edition (143 and 176, French edition), who cites this same passage, in the first instance for citron (lemon), and in the second for peach!

οὐδ' αὐτὰ αὐτοῖς ὁμοβλαστάνει τὰ γένη καὶ ὁμοκαρπεῖ. τοῦτο γὰρ ἐν τοῖς κεχωρισμένοις τῶν ὁμογενῶν ἀξιοῦμεν καὶ ὁρῶμεν συμβαῖνον. τὸ μὲν οὖν πάθος ὅμοιον φαίνεται τοῖς ἐπικυῖσκομένοις ζώοις, πλὴν γ' ἡ αἰτία τοῖς μὲν φανερά, τοῖς δὲ λόγου δεομένη.

(2) τὰ μὲν γὰρ οὐχ ἅμα λαμβάνουσι τὰς παρ' ἐτέρων ἀρχὰς οὐδ' ἴσως εἰς τὸν αὐτὸν τόπον οὐδ' ἅμα κυτίζεται, εἰ μὴ καθάπαξ ἅμα καταλάβοι. τῶν δὲ διὰ τί ἡ βλάστησις οὐχ ἅμα, οὐ ῥάδιον εἰπεῖν· ἀνάγκη γὰρ διὰ τὸ τὰς ρίζας μὴδ' ἅμα μὴδ' ὁμοίως ἔχειν ἢ τοὺς ἀκρεμόνας μὴ δέχεσθαι μὴδ' ἐκπέττειν ἐξ ὧν ἡ πρώτη βλάστησις. ταῦτα δὲ διὰ τί καὶ τίνος ἕνεκα γένοιτ' ἂν, οὐκ εὐλογον εἰπεῖν.

(3) ἡ μὲν γὰρ ἄμπελος ἡ μαινομένη τάχ' ἂν δόξειεν οὐκ ἀλόγως δέχεσθαι τῷ μὲν γὰρ μὴ ἐκπέττειν τὸν καρπὸν ὑπολείμματα πολλὰ ποιεῖται ὑγρότητος γονίμου. ταῦτα δ' ὅταν ἀῆρ ἐπιλάβῃ μαλακὸς ἐκτίκτει, καθάπερ καὶ ἄλλοις τῶν δένδρων αἱ πορρώτεροι βλαστήσεις ἐπιγίνονται. ἡ δὲ μὴλέα καὶ ὅσα ἄλλα τοιαῦτα τελεογονεῖ καὶ ἐκπέττει· διὸ τὸ μερίζεσθαι <καὶ>

Id enim dissidium esse in his tantummodo uolumus et euenire uidemus: quae nulla generis coniunguntur societate. G. | συμβαίων U (in—on erasum). | ἐπικυῖσκομένοις ζώοις: *animalium foetibus: qui praepostero concipiuntur.* G. | πλὴν γ' ἡ αἰτία Sch (ex πλὴν γ' αἰτία Mld); ζώοις πλάγια τοῖς μὲν U M A Sch (quitamen locum suspicatur); πλὴν γε τοῖς μὲν "quidam minores codd." (ap. Sch); ἀλλ' αἰτία Hns (e G: *sed causa: illis patescit:* etc.).

2. λαμβάνουσι Sch e λαμβάνουσα U M; λαμβάνοντα A Scl Hns; *quia . . . caeperint* G. | παρ' ἐτέρων om. G. | τόπων (in-on erasum) U. | εἰ . . . καταλάβοι om. G. | καθάπαξ conj. Wmr; καθάπερ U A Scl ("*quia est similitudo*") Sch ("*molestum . . . vitiosum uidetur.*"). | τῶν δὲ . . . εἰπεῖν. εἰ μὴ καθάπερ <τὰ ζῶα τὰς ἀρχὰς οὐχ> ἅμα καταλάβοι· ἀνάγκη κτλ. Sch. | μὴδ' ἅμα Sch e Vin et Vos; μῆδαμῃ U (sed post δ rasura) A Scl (qui tamen: "*quomodo nusquam, μῆδαμῃ, sint radices, nescio.*"). | δέχεσθαι μὴδ' ἐκπέττειν A Hns;—ἐπετειν U; δέχ. δὴ δ' ἐκπετεῖν M. | ἐξ ὧν: τὴν ὑγρότητα ἐξ ἧς maluerit Sch-ann. | γένοιτ' A Hns; γίνουτ' U Sch. | εὐλογον U A Scl Wmr; εὐκολον Hns Sch. | εἰ μὴ . . . πρώτη βλάστησις: *horum autem germinatio: quomobrem simul non fiat: haud facile dictum est. Quod enim radices non ubique uersus nec similiter habeantur: aut quod rami non recipiant succum: neque coquantur: quibus prima germinatio prouenire possit: illud ita fiat necesse est.* G.

3. ἡ μὲν Sch cum mrg-Vsc etc.; εἰ μὲν U M A Scl Hns. | ἡ μαινομένη Scl; σημαυνομένη U; σημαυνομένης M A; σημίσις Hns; *Vitem enim quam insanam uocamus* G. | τάχ' ἂν corr. Wmr; τάχα U A Scl Sch. | δέχεσθαι: λέγεσθαι vel ἔχεσθαι varr. lectt. ap. Dlc; *non procul argumento fortassis concepisse rursus*

The experience seems to be like superfetation,² but for that the reason is clear, while in plants it requires explanation.

Animals, moreover, do not get the life principle from the different male individuals at the same time, nor perhaps in the same spot;³ nor do they usually receive multiple impregnation at one time unless, perhaps, they lay hold of all the vital impulses⁴ at once.⁵ But why the budding forth of plants is not synchronous, it is not easy to say; for it must be because the roots do not all at the same time, or all equally, have that out of which the first budding results, or else because the branches do not receive or elaborate it at the same time or in like amount. But because of what and for what purpose⁶ this should happen, it is not easy to say.

The so-called "mad vine"⁷ might well seem not without reason to receive this sap. For, in that it does not fully ripen its fruit, it provides for itself large reserves of the engendering moisture; and whenever air that is mild lays hold of these, the vine brings forth just as later buddings succeed one another in other trees. But the citron, and others like it, bring their fruit to perfection⁸ and ripen it, wherefore the distribution of buddings through various seasons, and that too from a single natural impulse, seems remarkable. The perplexities that exist on these matters are somewhat such as we have just mentioned.

² Cf. Arist. *G. A.* 4: 5 (773 a, ff.) and notes in the Oxford trans.; Arist. *H. A.* 7: 4, end; Xen. *Cyn.* 5: 13.

³ Sc. of the womb.

⁴ Or, conceive several individuals at the same time. L. and S. appear not to treat the verb in any such sense as that found in this context.

⁵ Referring to multiple fetation by one act of coitus, as in swine, etc.

⁶ "First cause" and "final cause," as often in Arist.

⁷ C. 1. 18. 4; cf. H. 1. 13. 4.

⁸ Or, produce their fruit in due season. (L. and S.)

existimaueris G (pro τάχ' ἀναδόξειεν?). | τῷ . . . ἐκπέττειν Sch e G cum Hfm
et mrg-Vsc; τὸ—U A Hns—ἐπετειν U; μὲν om. Hns; *Haec enim quod minus*
suum excoquit fructum G. | ὑπολείμματα corr. Scl et habet Hns; ὑπόλειμμα τὰ
U A; *pleraque . . . residua continet.* G. | δ' ὅταν U A Hns; δέ, ὅταν Sch. |
πορρώτεραι conj. Wmr; πρῶται U A Scl Hns Sch (qui πρώται conjecit); *prima*
G. | μῆλεα corr. Scl et hab. Hns; μελία U M A G (*fraxinus*). | ἐκπέττει U A

ἄλλοτ' ἄλλο βλαστάνειν ἄτοπον καὶ ταῦτ' ἀπὸ μιᾶς ὁρμῆς. αἱ μὲν οὖν ἀπορίαι σχεδὸν αὐταὶ καὶ τοιαῦται εἴρηνται περὶ τούτων.

(4) πρὸς δὲ τὸ τὴν αἰτίαν τοῖς ἀπορουμένοις λέγειν πρῶτον ληπτέον ὅπερ εἴρηται καὶ πρότερον ὅτι πᾶν δένδρον ἀρχὰς πολλὰς ἔχει πρὸς τὴν βλάστησιν καὶ καρποτοκίαν· τοῦτο δ' ὥσπερ ἐλέχθη τῆς οὐσίας ὅτι καὶ πολλὰ χόθεν ζῆ διὸ καὶ βλαστητικόν. εἰσὶ δ' οἱ πρῶτοι τούτων ἀναγκαιότεροι, ἐκ τῶν ἀρχῶν δὲ τούτων οὐθ' ὅμοιοι πάντες οὐθ' ἴσοι οὐθ' ἅμα βλαστάνουσιν οἱ βλαστοί, ἀλλ' ὅταν ἢ πλείων συρροὴ καὶ ἰσχυροτέρα κατὰ ταῦτα θάττον καὶ πλείων· ἕκαστος γὰρ αὐτῶν ὥσπερ φυτὸν ἐστὶν ἐν τῷ δένδρῳ καθάπερ ἐν τῇ γῇ· μὴ ἅμα δὲ τῆς βλαστήσεως οὐσης μὴδ' ἴσης τῆς ἰσχύος εὐλόγως οὐδὲ τῶν καρπῶν ἢ πέψις ἅμα γίνεται πάντων.

(5) ἐπεὶ καὶ ἡ θέσις διαφορὰν ποιήσει τῶν μέρων οἷον ἢ πρὸς ἀνατολὰς ἢ δύσεις ἢ πρὸς ἄρκτον ἢ μεσημβρίαν· ὥσπερ γοῦν καὶ ὅλων τῶν δένδρων εἰ ἐν εὐδιενῶ τόπῳ· πρῶτ' βλαστῇ γὰρ ταῦτα καὶ πρῶτ' καρπα. τοιαύτης δὲ τῆς φύσεως οὐσης τῆς κοινῆς ὅπου μὲν ὁ ἀήρ μαλακὸς καὶ εὐδιενὸς ὀλίγον χρόνον <οὐ> βλαστητικὰ τὰ δένδρα γίνεται καθάπερ καὶ περὶ Αἴγυπτον, ὅπου δὲ χειμέριος καὶ σκληρὸς πλείω.

(6) τὸ γὰρ ὅλον βραχεῖά τις ἂν γένοιτο διὰ λειψίς εἰ ἢ ἐκ τῆς γῆς τροφῇ δαψιλῆς εἴη καὶ ὁ ἀήρ εὐκραής. ἐπεὶ καὶ τὰ μὴ φυλλορροοῦντα παρὰ τισιν οἷον συκὴ καὶ ἄμπελος διὰ τοῦτο οὐ φυλλορροεῖ καθάπερ εἴρηται δι·

etc.; ἐκπέπτει M. | καὶ ἄλλοτ' Hns; καὶ om. U M A Scl; ἄλλο τε καὶ τᾶλλο conj. Dlc; *et alias alium* G. | τοιαῦται Hns; τοιαῦτα U A. | αἱ μὲν . . . τούτων: *Ambiguitates hae fere sunt.* G (multo simplicius); aut αἱ μὲν . . . τοιαῦται., aut αἱ μὲν οὖν ἀπορίαι σχεδὸν εἴρηνται περὶ τούτων *legenda censet* Hindenlang, pp. 43 s., qui textum pro Theophrasti habitu dicendi nimium verbosum esse ducit.

4. ἀπορουμένοις A; εὐπορουμένοις U (et G: *pro facultate: quae in his rebus suppetat*). | εἰσὶ δ' οἱ corr. Sch; εἰ δ' οἱ U A Hns; *non paucioribus obtinet* G. | ἀρχῶν γε Sch-txt solus (quod iterum Tom. 5. pag. 83 rejecit). | τούτων: *his* . . . *ipsis* G (pro αὐτῶν ?). | οὐθ' ἴσοι Wmr (mend.); ἴσοι U. | ὅταν ἢ A Hns;—ἢ U Scl. | πλείω U (ν super ω rec. manu scriptum).

5. διαφορὰν (θ eraso) U. | γοῦν conj. Wmr; γὰρ A Scl; [γὰρ] Sch-syl; *quematmodum* et G. | εἰ ἐν εὐδιενῶ A;—εὐδεινῶ (ι super δ prima manu scriptum) U; εἰ ἐν εὐδιενῶ M; ἢ ἐν κτλ. Sch-txt; *ut si loca tenent serena* G. | χρόνον <οὐ> add. Sch (e G: *germina differunt*); οὐ om. U A Hns. | χειμέριος U (et Sch de suo); χειμέρειος M A Hns; χειμερινὸς Scl. | πλείω: *plus praetereat temporis necesse est:* G.

By way of giving an explanation for these perplexing questions, we might first consider what has been said before, namely, that every tree has in itself many of those vital elements both for budding and for bringing forth fruit; and this, as was said, is part of its very nature, because it has life in many different spots, for which reason it has also the power of budding there. Now the first of these shoots are more closely related, but from these beginnings the buds do not burst forth all alike, nor equally, nor at the same time. Whenever there is a greater and stronger conflux of food they grow, in proportion, more rapidly and more exuberantly; for each of the shoots is, as it were, a plant in the tree instead of in the earth. If the budding forth does not occur at the same time, or if the vigor is not all alike, it is reasonable that the ripening of the fruit should also not take place at the same time in all of them.

Their position, moreover,—as to whether they face east or west, north or south—will also make a difference in the parts, just as, in fact, it makes a difference in the whole tree if it is in a favorable spot, for then it is an early grower and an early producer of fruit. Since their common nature is of this kind, wherever the climate is mild and favorable they cease growing for a short time as they do also in Egypt.⁹ But they cease growth for a longer time where it is wintry and inclement.

In general there would appear to be a short intermission if the nutriment from the soil be abundant and the climate mild. Moreover those trees such as fig and vine, which in certain places do not shed their leaves, do not shed them for the reason

⁹ H. 1. 9. 5.

6. τις ἂν U; ἂν om. A Scl (βραχ. γένοιτό τις) Hns Sch-txt. | διάλειψις A; διάληψις U: *in totum enim brevis quaedam intermissio fiet* G. | εἰ ἢ Wmr; ἢ τ' U M A; εἰ ἢ ἐκ τῆς τροφῆς conj. Scl; <εἴπερ> ἢ τ' Sch; ἦντε Hns; *si tellus copiosum praebeat alimentum* G. | φυλλοροῦντα (o super p scriptum) . . . παράτησιν (η in i erasum) . . . φυλλοροεῖ U. | τοιαύτην corr. Wmr; τι ταῦτόν U A Hns Sch; *idem aliquid sortiuntur* G. | διαρχεας A; δι' ἀρχεας U; *ubertas assidua* G. | ὧν τὰ μὲν Sch cum mrg-Vsc e G (*eorundemque alia . . . alia*); δι' ὧν U A

ὅτι διαρκῆς ἡ τροφή· τουτὶ μὲν οὖν κοινὸν ἐπὶ πλείονων ἐστί· τὰ μὲν γὰρ διὰ τὴν φύσιν, τὰ δὲ διὰ τὸν τόπον ἔχει τοιαύτην. διηρημένων δὲ τῶν μὲν φυλλοβόλων, τῶν δὲ ἀειφύλλων αἰτίας δ' οὕσης τοῖς ἀειφύλλοις τῆς διαρκείας τῆς τροφῆς, ὧν τὰ μὲν διὰ τὴν ἰδίαν φύσιν, τὰ δὲ διὰ τὸν τόπον τοιαῦτα.

τρίτον δὴ καὶ ὥσπερ ἐφεξῆς τοῦτοις τὴν ἀειβλάστησιν θετέον, ὅτι τὸ ἀειφυλλὸν οὐκ ἀειβλαστές. ἀλλ' ἐκεῖνα μὲν ὥσπερ διατηρεῖν μόνον δύνανται τὰ προϋπάρχοντα ταῦτα δὲ καὶ προσεπιγεννᾶν ἕτερα διὰ τὴν ἰδίαν δῆλον ὅτι φύσιν· τοῦτο δὲ καὶ ἐν ἄλλοις μέχρι τινός.

(7) ἐπιβλαστάνει μὲν γὰρ τὰ μὲν ἅμα τοῖς ἄστροις, τὰ δὲ καὶ ἀορίστως ὥσπερ καὶ ἄμπελος. ὁ δὴ τοῦτοις μέχρι τινός <ἐκείνοις> δι' ὅλου δέδωκεν ἡ φύσις ὥστ' αἰεὶ βλαστοφυνεῖν καὶ καρπογονεῖν. οὕσης δὲ τοιαύτης τῆς οὐσίας οὐδὲν ἄτοπον ἦδη τὰ μὲν τελεοῦν, τὰ δ' ἀνθεῖν, τὰ δὲ βλασταίνειν, τὰ δὲ μέλλειν· ἐπέειπερ οὐδ' ἐν τοῖς ἄλλοις δένδροισιν ἅπανθ' ἅμα τὰ μέρη διαφέρει δὲ τοῖς χρόνοις ὅτι τὰ μὲν ἄλλα παρ' ὀλίγον, τὰ δ' ἐφεξῆς.

(8) ἀλλ' ἐκεῖνο μᾶλλον ζητητέον τίς ἢ πόθεν ἡ κρᾶσις καὶ ἡ σύστασις τῶν τοιούτων· ἔοικε δὲ παραπλήσιον πλὴν χαλεπώτερον καὶ τίς ἢ τῶν ἀειφύλλων· προσεπιπείν γὰρ δεῖ καὶ διὰ τί τοσαύτην λαμβάνει καὶ δύναται πέττειν ὥστε γεννᾶν. ἡ γὰρ ἐπιβλάστησις καρποτοκίας ἔνεκα· ἐπεὶ τό γε πλείους ἅμα καρποὺς ἔχειν τὸν μὲν τέλειον, τὸν δ' ἀτελῆ, τὸν δ' ὑπο-

Hns. | τὰ μὲν τὴν ἰδίαν . . . τόπων (in-on erasum) U. | τρίτον δὴ Sch cum mrg-Vsc e G (*tertium iam*); τρ. δὲ U A Hns. | ἕτερα corr. Scl e G (*alia* . . . genera); ἐτέραν U. (v erasum) A. Hns. | φάσιν (prima manu linea obliqua per a notata et v superscriptum) U.

7. ὁ δὴ U; ὁ δὲ A Scl Hns Sch-txt. | <ἐκείνοις> add. Hns (e G: *illis*); om. U A Scl. | ὥστ' αἰεὶ conjicio (e G: *ut semper germinent: semperque fructificent*); ὥστε καὶ U A Hns Sch Wmr; καὶ om. Scl. | βλαστοφυνεῖν κ. καρπογονεῖν Sch e G cum mrg-Vsc; καρποφυνεῖν κ. καρπογον. M A Scl; καρποφ. κ. βλαστογ. U; καρποφυνεῖν Hns A-Cam (κ. καρπογονεῖν omissis). | τελεοῦν U M; τελειοῦν A Hns Sch. | μέλλειν: *superfoetant atque parturiunt* G. | διαφέρει . . . ἐφεξῆς om. G. | διαφέρει δὲ corr. Sch; —τε U A Scl Hns. | ὀλίγον, τὰ δ' corr. Sch; ὀλίγον τῷ U A Scl Hns.

8. χαλεπώτερον corr. Sch; -τέρω U; -τέρω M; -τέρως A Scl Hns. | παραπλήσιον καὶ . . . ἀειφύλλων· πλὴν χαλεπ. Sch-txt solus ("cum G"); *Quod simile esse uidebitur: ut si quaeram: quae temperies semper frondentium sit: praeter quod hoc: aliam quoque rationem desyderet.* G. | τροφήν post τοσαύτην add. Sch (e G); "*intelliges ἕλην*" Scl. | λαμβάνειν Sch cum G: *tantum alimenti haurire: atque incoquere possint.* | ἔνεκα corr. Wmr; γέννησις U A Scl (qui

given: that their nutriment is sufficient at all times. Such a supply is common in a large number of trees, in some because of their nature, in others because of their situation. But although trees are classified¹⁰ as deciduous and evergreen, and although the reason for the evergreen sort is their continual sufficiency of food (in some on account of their nature, in others of their situation), still we ought to add to these as it were next in order, a third class, namely the ever-budding, because the evergreen is not ever-budding.¹¹ The former can only keep pre-existing parts, while the latter can create still others, just because of their own peculiar natures.

This is true also in others to a certain extent, for some have additional growth at the time of the rising of certain stars,¹² others, like the vine, at no fixed period. To the latter Nature has given partially, to the former she has given absolutely, the power to keep producing¹³ buds and fruit. Now since their nature is of such a sort, it is not surprising that some parts are reaching maturity, some are flowering, some are budding forth, and some are just about to bud forth; since not even in the other trees are all the parts found at the same time; but they differ in their seasons, some following along at short intervals, others continuously and immediately.¹⁴

We should, however, seek still more to find out what is the nature or origin of the temperament¹⁵ and composition¹⁶ of such plants. A similar but more difficult question might be raised about the evergreens, for we ought to make this additional inquiry: how they get so much food, and how they can elaborate it so as to keep reproducing. For the continual budding is for the sake of bearing fruit, since it happens that they have at the same time fruits in different stages of development: mature,

¹⁰ H. 1. 9. 3. ff.

¹¹ *I.e.* not necessarily; see Scaliger 45. 2. C, and cf. section 8 of this chapter.

¹² Arcturus, etc., as above; cf. H. 1. 9. 7.

¹³ Reading my conjecture (from G).

¹⁴ H. 6. 8. 4.

¹⁵ A mixture of opposing elements.

¹⁶ A union of naturally congruous elements. See Arist. *Gen. et Corr.* 1. 10 (327, 328).

φυόμενον. συμβαίνει καὶ τῇ ἀρκεύθῳ καὶ ἄλλοις ὧν βραδεία τε ἢ ἔκπεψις καὶ δυσἀπόπτωτος ὁ καρπός. ἡ μὲν οὖν τούτων αἰτία μέχρι τούτων εἰρήσθω τὰ νῦν.

XII. Πότερα δ' ἢ βλάστησις καὶ αὔξησης ἅμα τῶν ἄνω τε γίνεται καὶ τῶν ὑπὸ γῆς ἢ διηρημένοι τοῖς χρόνοις· ὥσπερ τινές φασι τὰς μὲν ρίζας αὐξάνεσθαι μετοπώρου καὶ χειμῶνος, τὰ δὲ στελέχη καὶ τοὺς ἀκρεμόνας ἔαρος καὶ θέρους καὶ μάλισθ' ὑπὸ τὸ ἄστρον. τοῦτο δὲ κατὰ λόγον οὕτω συμβαίνειν, τῇ γὰρ πρώτῃ γενέσει κατακολουθεῖν· ἐν ἐκείνῃ γὰρ τὴν ρίζαν πρότερον ἢ τὸν βλαστὸν ἀφιέναι πάντα· προϋπάρχειν γὰρ ἀναγκαῖον, ᾧ τὴν τροφήν ἐπάξεται.

(2) φανερόν δὲ καὶ ἐν ταῖς μετοπωριναῖς φυταῖσι· τότε γὰρ ριζοῦται οὐ βλαστάνει δὲ τὰ φυτευόμενα ἢ ἐπὶ βραχὺ τι πρὸ τοῦ ἔαρος· εἰ γὰρ ἦν ἄρριζα, ἐσῆπτε' ἄν. ἀλλὰ διὰ τοῦτο ἐπαινοῦσι ταύτην τὴν φυτείαν, ὅτι μᾶλλον τὰς ἀρχὰς ἰσχυροτέρας ποιεῖ δι' ὧν καὶ ἡ τοῦ στελέχους καὶ ἡ τῶν ἄλλων γενέσεις· ὥς τὰ γ' εὐθὺς ἀνατρέχοντα πρὸς τὴν βλάστησιν ἀσθενῇ καὶ ἄκαρπα γίνεται, καθάπερ ἐπὶ τῶν σπερμάτων οἱ Ἀδώνιδος κῆποι.

“quomodo?” quaerit) Hns Sch; *germinatio . . . fructus generatio est.* G. | τὸ γε Sch cum mrg-Vsc e G (*quidem*); τὸ τε U A; τότε Scl Hns. | τῇ ἀρκεύθῳ Sch cum mrg-Vsc; τῷ ἀρκ. U A Hns; *uel uiuipero* G (*et iunipero* ap. Hns). | δυσἀπόπτως U A Hns etc.; *δύσπεπτος* vel *δυσἀπόπεπτος* maluit Scl. | τὰ νῦν U (*plerumque*); τανῦν A Hns Sch-txt; *fructus absolui difficile potest.* G.

1. πότερα M Sch; ποτέρα U A Scl; πρότερον Hns. | βλάστησις A Scl Hns Sch; βλαστῇ U M; *germinatio* G. | ἅμα τῶν ἄνω cum cett. U (non ἀπὸ κτλ. ut ap. Sch-syl.). | ὑπὸ τῆς γῆς Scl solus. | στελέχει καὶ τοὺς (κ. τους *erasa*) ad fin. paginae 152, et incipit καὶ τοὺς pag. 153 U. | ἔαρος U (et correxerat Scl); ἀέρος A Hns; *per uer* G. | μάλισθ' ὑπὸ A Hns Sch; μάλιστά θ' ὑπὸ U; μάλ. ὑπὸ Scl; μάλ. δ' ὑπὸ Wmr; *et praecipue sub sydus* G. | ὑπὸ ἄστρον U M. | οὕτως U M. | συμβαίνειν corr. Sch; συμβαίνει U A Hns; *fieri* G. | τῇ γὰρ corr. Sch; ἐν γὰρ τῇ U A Hns; ἐν τῇ Scl; *siquidem et in* (pro εἰ δὴ καὶ ἐν τῇ?) *prima generatione sequi identidem soleat* G.

2. φοιτεῖας (in *φυτ.* *erasum*) U. | ριζοῦται A; -σται U; -σθαι M; *radices capescere* G. | βραχὺ τι conj. Scl; πρὸ conj. Wmr; τοῦ ἔαρος Sch cum Hfm; βραχύτητα τοῦ ἀέρος U M A; βραχὺ τι. τὰ δὲ τοῦ ἀέρος ἐπὶ τὸ πολὺ. Hns, (quae verba, ut Gazae ignota et glossema, exulare jubet, ἔαρος pro ἀέρος legi vult Palmer. Exercit. (1668) pag. 604); βραχὺ τι ταῦτα δὲ τοῦ ἔαρος Sch; *non*

immature, and just starting. This may be observed in the Phoenician cedar and others, whose elaboration is slow and whose fruit is very tight clinging. So far as our discussion has gone, this must suffice as an explanation of these facts.

XII

Now do budding¹ and growth in the parts of plants that are above ground take place at the same time as they do in the parts below; or is there a difference in the times? For there are some who say that roots grow in fall and winter, while trunks and branches grow in spring and summer, especially so in dog days. It is reasonable that this should be the case, for in the first germination these parts follow the others. In that first germinating all plants send out the root² before the bud, because there must first be provided that by which the plant shall procure its food.

This is evident also in fall planting, because at that time the plants root but send out no buds or very few before spring (for if the plants were rootless they would rot). This, then, is the reason why men favor fall planting, because the life principles, from which comes the growth of stalk and other parts, are thus rendered stronger. Those that run up at once to growth become weak and sterile so far as seed production is concerned, just as is the case in the "Gardens of Adonis."³

¹ H. 3. Chap. 5.

² H. 1. 7. 1.

³ H. 6. 7. 3; ("Small flower pots in which fennel, lettuce, wheat, and barley were sown, which, withering quickly, symbolized the death of Adonis." Th-Dyer in *Comp. Gk. Studies*, sect. 99). See Plato, *Phaedr.* 276 b; Theoc. 15: 113.

germinare nisi paululum. Nam si G. | *εἰ γὰρ U A Hns Sch; ἡ γὰρ M.* | *ἀριζα U.* | *ἐσθ' ἡν' ἄν: mox putrescerent: atque perirent. G.* | *δι' ὧν ἡ Wmr solus; uitque (utique ap. Hns) et caudex: et reliqua generatio prodit. G.* | *γένεως U.*

(3) πιθανὸς δὲ καὶ ταύτῃ δόξειεν <ἂν> ὁ λόγος ὅτι τὰ μὲν ἄνω κωλύεται διὰ τὸν περίξ ἀέρα ψυχρὸν ὄντα, τὰ δὲ κάτω στεγαζόμενα τῇ γῇ καὶ ἅμα συγκατακλειόμενα ὑπὸ τοῦ θερμοῦ διὰ τὴν ἀντιπερίστασιν τῇ τε ὑγρότητι καὶ τροφῇ προσαύξεται. πάντα γὰρ αὐτοῖς ὑπάρχει δι' ὧν ἡ αὐξήσις καὶ ἡ γένεσις. σημεῖον δὲ καὶ τὸ ἐπὶ τοῦ σίτου συμβαῖνον, ὅς ὑπὸ τοῦ χειμῶνος πιλούμενος ῥιζοῦται μᾶλλον, ὃ δὴ καρκινουῖσθαι λέγουσιν, ὡς τὴν ἀπὸ τῶν ἄνω δυνάμιν καὶ τροφὴν εἰς τὰ κάτω τρεπομένην.

(4) ταύτῃ μὲν οὖν δόξειεν ἂν μερίζεσθαι τὸ τῆς αὐξήσεως· τῇδε δὲ πάλιν οὐκ ἂν δόξειεν, ἐν τε γὰρ τῇ πρώτῃ γενέσει προτερεῖ μὲν ἡ ῥίζα τῶν βλαστῶν οὐ μὴν τοσοῦτον ὥστε χρόνον γίνεσθαι πλήθος, ἀλλὰ βραχὺ τι πάντως ὥσπερ καὶ ἐπὶ τῶν ζώων ἡ καρδία καὶ τὸ περὶ τὴν καρδίαν· ἀπλῶς γὰρ ὡς εἰπεῖν ἡ φύσις οὐθὲν καθάπερ ἡ τέχνη ποιεῖ κατὰ μέρος, ἀλλὰ πάντ' ἄθροα καταβάλλεται. συντελεῖ δὲ ἐτέρων ἕτερα πρότερον. εἰ δὲ καὶ ἐν τῇ πρώτῃ γενέσει τοῦτ' ἐπὶ τινων ἀναγκαῖόν ἐστιν, ἀλλ' οὔτι γε ἐν τῇ τροφῇ καὶ αὐξήσει, τὰ μὲν πρότερον τρέφεσθαι, τὰ δ' ὕστερον, ὥσπερ οὐδ' ἐπὶ τῶν ζώων, ἀλλ' ἅμα πως μάλιστα πάντα καὶ ὁ ὅλος ὄγκος ὥσπερ κατὰ συνέχειαν καὶ τρέφεται καὶ ἐπιδίδωσιν. ὃ καὶ κατὰ τὴν αὐξήσιν ἐστι φανερόν.

(5) ἐπεὶ καὶ ἄτοπον εἰ τὸ θρεπτικόν, ὃ δὴ διαπλάττει καὶ δίδωσι τροφάς, διαιρεῖται κατὰ μέρη τὴν ἐνέργειαν· ἢ πάλιν εἴ τι τῶν σωματικῶν τὸ

3. <ἂν> Wmr; om. U A Hns Sch. | στεγαζόμενα: *obrutae obsessaeque undique* G. | συγκατ. . . . θερμοῦ U A Scl Hns Wmr; ὑπὸ τ. θ. συγκατακλειομένου Sch-txt; *sufferuefactae* (i. e. *partes*) *calore* G. | διὰ τὴν ἀντιπερ.: *qui* (i. e. *calor*) *fugatus iniuria frigoris se ad ima recepit* G. | τῇ τε . . . τροφῇ Wmr; ἔτι τε ὑγρότητα κ. τροφὴν U A Hns (et <δι'> post τε Sch); *atque etiam humoris alimentique copia referte* (i. e. -ae) G. | προαύξεται conj. Sch-ann. | καὶ γένεσις U. | πιλούμενος: *obstipata: perstrictaque* G. | τῶν ἄνω U (et Sch e G); τοῦ ἄνω A Hns; *partibus superis* G (qui addit: *regressusque fiat modo itineris cancri*).

4. τῇδε δὲ Wmr; τῇδε δὲ δὴ U; τῇ δέδεν M; τῇδε δὲ γε A; τῇ δὲ γε Scl Hns Sch. | γενέσει προφθάνει mrg-Vsc (et Sch-txt; in auct. προτερεῖ restituit); *prouenit* G. | βραχὺ τι U; βραχύτητι M; βραχύτατον A Hns Sch. | πάντως Wmr; πάντων U M A Hns Sch; *ita ut breue admodum intelligi possit*. G. | περὶ καρδίαν Hns solus. | οὐθὲν U M Sch; οὐδὲν A Hns. | πάντ' A Hns Sch; *pān* (-τ' rec. manu) U; πάντα Scl. | ἐπὶ τινων om. G. | οὔτι M Sch; οὔτε U (in οὔτι erasum) A Hns; οὔτοι mrg-Vsc. | τὰ δ' A Hns Wmr; τὰ δὲ Sch. | μάλιστα U. | πάντα Sch (e G: *omnia . . . aluntur*); πάντως U M; πάντων A Hns. | ὁ ὅλος U; ὅλος ὁ Sch; ὃ om. A Scl Hns. | ὥσπερ corr. Sch; ὥστε U A Hns.

This explanation seems credible also from the fact that the upper parts are hindered⁴ by the surrounding air, which is cold, while the lower parts are covered with soil, and, at the same time, because of the counter pressure,⁵ are closed up with warmth and so grow on the moisture and food; for they are provided with everything requisite for growth and reproduction. We may cite as evidence what we observe in grains, which, being contracted by the winter, get stronger roots, (a process which the farmers call "crab-rooting"),⁶ as the strength and nourishment from the upper parts are directed down into the lower ones.

In this way then, it would seem, is the growing process distributed; but from another point of view it would not appear so. For, in the first springing forth of the plant, the root gets the start of the buds, not however by any great length of time, but really by a very short one, just as is the case too in animals with the heart⁷ and pericardia. In brief, Nature, we might say, does not do her work piecemeal as does Art, but lays her foundations for all parts at once and then works on, bringing some to perfection before others. Now if for certain plants it is necessary in the beginning of generation, though not in their nourishment and growth, that some parts should be nourished first, others afterward (as is not the case in animals), at any rate all the parts and the whole structure, as it were in continuity, receive nourishment and grow. This is clearly seen in their manner of growth.

Then too it would be irrational if the nourishing force, which is exactly that which fashions the plant and furnishes its food, should itself divide its energies piecemeal; or, again, if the

⁴ Varro *R. R.* 1. 45. 3.

⁵ C. 2. 9. 8; C. 6. 8. 8; C. 2. 6. 1.

⁶ *I. e.*, crooked like a crab's claws, tangled; cf. H. 1. 6. 3; C. 3. 21. 5; C. 3. 23. 5.

⁷ Arist. *G. A.* 2: 4 (740 a); see also *H. A.* 3: 2 (511 b.)

5. ἀτοπον εἰ U; ἀτ. ἐστίν, εἰ Sch-ann; ἀτ. ἐστίν ἐς (pro εἰ?) Hns; ἀτ. ἐστὶ A Scl; *absurdum si* G. | διαίρεται U; διαίρ. δὲ M A; διαίρειν Hns; διαίρειν ὥδε

ἐνεργοῦν οἷον πνεῦμα ἢ πῦρ· οὐδὲ γὰρ ταῦτα εἰκός, ἀλλ' ὅταν ἅμα ταῖς ὥραις κινηθῶσιν ὁμοίως δι' ὄλων διήκειν τῶν φυτῶν· ἐν γάρ τι τὸ γεννῶν, οὐχ ὥσπερ Ἐμπεδοκλῆς διαιρεῖ καὶ μερίζει τὴν μὲν γῆν εἰς τὰς ῥίζας, τὸν δ' αἰθέρα εἰς τοὺς βλαστοὺς ὡς ἐκάτερον ἐκατέρου χωριζόμενον, ἀλλ' ἐκ μιᾶς ὕλης καὶ ὑφ' ἐνὸς αἰτίου γεννῶντος. ὡς ἡ τῶν ὄλων σύστασις μικρὰν αἰετίναν λαμβάνει ἐφεξὶν καὶ κατὰ τὰς τροφὰς καὶ κατὰ τὰς αὐξήσεις. ὥστε δ' ὄλαις ὥραις χωρίζειν μέγα κομιδὴ τὸ διάστημα τῶν χρόνων.

(6) ἡ δ' ὑπὸ τοῦ ψύχους κώλυσις τῆς βλαστήσεως ἀληθὴς μὲν οὐκ ἔτι δὲ ποιεῖ μερισμὸν φυσικόν. ἀλλ' ὥσπερ ἐν συμβαίνοντι τὸ προσαυξέσθαι τὰς ῥίζας· ὁ καὶ καθηκούσης ἐνιότητι γίνεταί τῆς ὥρας ὅταν ἀντικόψῃ ὁ χειμὼν· ἡ μὲν γὰρ βλάστησις κατέχεται, τὰ δὲ τῶν ῥιζῶν οὐ κωλύεται διὰ τὴν ἀλέαν, ὅταν ἤδη προορμώμεναι τύχῃσιν εἰς ἔκφυσιν καὶ αὐξήσιν ἔρχεσθαι. ἀλλὰ τοῦτο οὐ τῆς φύσεως θετέον ὁ διακωλύει ποτὲ συμβαίνει τι τῶν ἐκτός, ἀλλ' ὅσα τῇ ὁρμῇ γίνεταί τῇ αὐτῇ.

(7) ὠραίων δὲ χειμῶνων καὶ εὐδαινῶν γενομένων ἅμα τὰ τε ἄνω καὶ τὰ

Sch-txt. | εἰ τι corr. Sch e G (*uel siquid*); ἐπὶ U A Scl Hns. | σωματικῶν: *extrinsecus* G (ubi putat Sch interpretem *ἐξωτικῶν* vidisse). | πνεῦμα καὶ πῦρ Scl. | γεννῶν καὶ οὐχ Hns. | ἐκατέρου χωριζόμενον Sch e G (*alterum seiungi ab altero*); ἐκατέρῳ χωρ. U M A; *tribuique uni tantummodo posset* add. G. | ἀλλ' ἐκ U A Hns Wmr; ἀλλὰ μὴ ἐκ mrg-Vsc Sch G (*nec ex una materia*). | ὄλων U A etc; ὄλως Scl 52. 2. A. (ὄλων 49. 2. D.) | μικρὰν . . . ἐφεξὶν Wmr; μικρά, εἴπερ ἐλάμβανε πρὸς ἕξιν U A Scl; μακρά Hns (*cetera ut* U); μακρά, ἐπεὶ περ ἐλάμβανέ πως ἕξιν Sch; μικρά, ἥπερ λαμβάνει πως ἕξιν Dlc. | ὥραις corr. Sch; χώραις U A Scl Hns; *locis* G. | μέγα κομιδὴ A; μετὰ κομ. U M; *magnum admodum* G. | ὡς ἡ . . . αὐξήσεις *praeteriit* G.

6. ὥσπερ ἐν conj. Wmr; ὥσπερ εἰ U M A; ὥσπερ εἰ Hns Sch-txt. | συμβαίνοντι τι U M A; συμβαίνοι τι Hns. | τὸ προσαυξέσθαι Wmr e Sch; <ἔοικε (e Scl: "*subintelligitur*" 50. 1. B.) τὸ> προσαύξ. Sch; προσαυξεστέρας U M Hns; πρὸς αὐξεστέρας A; *Accidit enim ut radices aliquorum increscant* G. | ἐνιότης γε U (duobus litteris inter duas voces erasis) et M; γε om. A Scl Hns; *nunquam* G (*pro nonnunquam?*). | γίνεταί corr. Sch cum G (*euenit*) et mrg-Vsc; γίνεσθαι U Scl Hns; γίγνεσθαι A. | ἤδη U M; δ' ἤδη A Scl Hns Sch. | προορμώμεναι corr. Scl et habent Hns Wmr; προορῶμεναι U (*rec. manu μ addito*) et M A; *cum radix ipsa ad eruptionem: auctionemque plene turgida constat*. G. | ἔκφυσιν <δέ> καὶ Sch-syl. | ἔρχεσθαι corr. Wmr; ἔρχεται U M; ἔρχονται A Hns Sch-txt. | οὐ τῆς corr. Scl; οὕτως U M; οὕτω A; *Id igitur tribui naturae non debet* G. | δ διακωλύει . . . τι τῶν U A; φ διακωλύει conj. Sch; διακωλύσει ποτὲ συμβ. τῆς τῶν, κτλ. Hns.

energizing force be regarded as one of the corporeal elements like air or fire, that it should do so; for this also is unlikely. But, whenever the parts are activated at various seasons, then it is reasonable that the force should permeate all parts of the plant equally. For the generative principle is a unit. It is not as Empedocles⁸ divides and apportions it, saying that the earth goes to roots while the air goes to branches—as though one were separated from the other; but from one stuff and under the influence of one single generating cause do the parts come. The building up of the entire organism always gets some small check⁹ both in the matter of nourishment and of growth, but in such a way that periods of growth very largely coincide with the seasons of the year.

The statement that because of the cold there is a hindrance of growth is true; but this hindrance makes no discrimination in the part of the plant it influences. It is rather as if by accident that the roots get additional growth. This sometimes happens when the proper developmental stage arrives, even though the cold weather resists. For, although budding is kept in check, still, because of their warmth, growth of the roots is not hindered whenever they happen already to be pushing forth for the production of shoots and growth. If any such check to growth does happen from an external source, it must not be assigned to the plant's nature; those only must be assigned to nature that happen from its own natural impulse.

Now when the winters are mild¹⁰ and moderate, both the upper and lower parts get growth. For whenever the climate is favor-

⁸ Cf. Arist. *de Anim.* 2: 4 (415 b-416 a).

⁹ See Hindenlang, page 105, note 2. Wimmer's Latin—*tolorum enim corporum compositio absolvitur quidem in intervallis ut incrementum aliquando semper cesset, neque vero spatia sunt tanta ut ipsis anni temporibus disjungere possis*—can scarcely be said to translate his Greek.

¹⁰ C. 5. 1. 4.

7. εὐδιενῶν U A; εὐδινῶν M. | γενομένων corr. Wmr; γινομ. U A Hns Sch. | ἄμα U A; ἀλλὰ M. | τὰ ante κάτω om. Hns. | αἰθήσεις, οὐ περιζόμενα τοῖς χρόνοις Sch. | <ὁ> addidit Sch. | εὐβλαστῆς U A; ἐκ βλαστῆς M; εὐκραῆς Hns;

κάτω λαμβάνει τὰς αὐξήσεις. ἐπεὶ ὅπου <δ> ἤρ εὐβλαστής καὶ μαλακὸς βραχύν τινα χρόνον ὥσπερ εἴρηται διαλείπουσιν αἱ βλαστήσεις οὐ μερίζομένων τοὺς χρόνους. τοὺς δὲ χειμῶνας οὐ μόνον τὰς βλάστας, ἀλλὰ καὶ τὰς ρίζας εὐλογον κατέχειν εἴπερ ἀπὸ τῆς τοῦ ἡλίου θερμότητος καὶ αἱ τούτων αὐξήσεις καὶ γενέσεις οὐκ εἰς πλεῖον καταλαμβάνουσαι βάθους οὐ ὁ ἥλιος ἐφικνέεται· πλὴν ἔαν που τόπος εὐδίοδος ἦ καὶ μανὸς καὶ κενός. μὴ γὰρ τούτου συμβαίνοντος ἀπορήσειεν ἂν τις εὐλόγως, διὰ τί ποτ' οὐκ αὐξάνονται τοῦ χειμῶνος τροφήν τε λαμβάνοντα καὶ ἀποστέγοντος τοῦ ψύχους. τάχα δὲ καὶ τοῦτο κοινὸν ἀπόρημα καὶ ἐπὶ τῶν ἄλλων μερῶν.

(8) ἅπαν μὲν γὰρ τὸ ζῶν τρέφεται, τὸ δ' ἐν ὁρμῇ τῆς αὐξήσεως ὃν [οὐκ] αὖξεται· τὰ δὲ φυτὰ πανταχῇ καὶ τὰ νέα καὶ τὰ παλαιὰ προορμᾷ πρὸς αὖξιν. εἰ μὴ ἄρα συμβαίνει τότε μὲν αὐξάνεσθαι τοὺς ὅλους ὄγκους ἅμα δὲ τῇ ὥρᾳ διαγελώσῃ τὰς ἐκβλαστήσεις γίνεσθαι· τοῦτο δὲ οἷον γενέσεις τις ἦδ'· διὸ καὶ οὐκ ἄλογον ἐν αὐτοῖς ὥσπερ κύντα κατέχειν ἢ συναθροίζοντα καὶ λαμβάνοντα πρὸς τὴν κήσιν ἐν οἷς ὄγκος γίνεται καὶ αὖξιν, εἴθ' ἅμα ταῖς ὥραις ἀποτίκτουσιν.

(9) ἔχουσι γὰρ δὴ τινες οἱ κλάδοι καὶ οἱ ἀκρεμόνες ἐν ἑαυτοῖς ἀρχὰς ζωτικὰς, αἱ διαθερμαίνόμεναι τῇ ὥρᾳ προΐενται τοὺς βλαστοὺς καὶ μὴ ρίζουμένων τῶν κάτω· τοῦτο δὲ μάλιστα φανερόν ἐν τοῖς ἀφαιρουμένοις φυτοῖς τῶν ἀμπέλων τε καὶ ἐτέρων καὶ συντιθεμένοις ἐν πίθοις· προβλαστάνουσι γὰρ

caelum mite et germini congruens G; “ἤρ μαλακός, ut supra εὐβλαστής” Scl in comm. 50. 2. B, (unde videtur ille εὐβλαστής καὶ hoc loco omisisse). | μερίζομένων U M A; μερίζομεν οὖν Hns; οὐ . . . χρόνους transposuit Sch; om. G. | τὰς βλάστας U M Wmr; τὰς βλαστήσεις A Hns Sch. | ἀλλὰ corr. Scl (e G: *sed etiam radices*); om. U A Hns. | καταλαμβάνουσαι M A; -σι Hns (et U, sed -σαι superscripto). | βάθους οὐ U Wmr; βάθος ἂν M A; βάθος ἢ ἂν Scl; βάθος ἂν μὴ Hns; βάθος ἢ οὐ ἂν Sch. | ἐφικνέεται U; -νῆται A Hns Sch-txt. | μανὸς U A etc.; *molle* G (pro μαλακός?). | συμβαινουσινοντος habere videtur U, sed -νουσι- (vel quaelibet) bene erasa sunt. | διὰ τί ποτ' οὖν A Hns; διὰ . . . οὐκ corr. Sch (e G: *augescere nequeunt*); διὰ ποτ' οὖν M.

8. τὸ ζῶν corr. Scl (e G: *Alitur enim unumquodque quamdiu vivit*); τὸ ζῶιον U M; —ζῶιον A Hns. | οὐκ delendum censet Sch-ann (e G: *Augetur uero*); postea autem (cur-sec), “negationem” ait “*abesse non posse video*”; οὐκ habent U A Hns; [οὐκ] Wmr, et, in versione, [non]. | προορμᾷ U (et correxerat Sch); παρορμᾷ A Scl Hns; se . . . *compellunt* G. | ὅλους ὄγκους: *molles* G. | ἐν αὐτοῖς Sch (e G: *in se*); ἐπ' αὐτοῖς U A Hns. | κατέχει M. | ἢ delendum censet Sch; *ueluti praegnantia gestant: et aggregato: praeeparatoque humore ad generandum* G. | κήσιν <ἐκείν> ἐν οἷς fortasse legendum? | ἐν οἷς αὖξιν om. G. | ἀποτίκτουσιν U M A; ἀποτίκτειν Scl Hns; *partus egerunt* G.

able and gentle, budding in plants whose growth is not limited to certain seasons is interrupted, as we have said, for only a brief period. But that winter weather holds back not only the growth of buds but also that of roots is reasonable if it be true that both the growth and budding of the latter, too, are affected by the heat of the sun and can go no deeper than the heat of the sun penetrates,¹¹ unless the soil happen to be easily permeable, loose, and free of obstructions. If this were not the case, one might well wonder why the roots do not grow in winter since they receive food and the cold keeps away from them.

Perhaps this question is a general one and concerns also the other parts of the plant. For though every living thing is nourished, growth will result only when it is stirred by the impetus for germination. Now all plants everywhere, old as well as young, feel the urge for growth. Possibly in winter the whole organism does increase at the same time; but as soon as Spring smiles upon it, there is a shooting forth, and this is just a sort of birth. Accordingly it is not without reason that the plant keeps its young, as it were, within itself, and gathers together and takes for its conception those elements of which the whole individual and its growth consist; and then, when spring comes, it brings forth.

For the branches, whether large or small, have within themselves certain vital principles which, when they are warmed up in spring, send forth buds even though the plants be not rooted below. This is most readily seen in the slips taken from vines¹² and other plants and set in pots; for as soon as the season comes

¹¹ H. 1. 7. 1; C. 3. 3. 1.

¹² H. 2. 1. 3.

9. καὶ συντιθεμένοις ἐν πλθοῖς A Hns; συντιθεμένων κτλ. U M; ἐν τοῖς πλθ. συντ'οῖς Scl; φυτοῖς <τοῖς> τῶν . . . ἐτέρων ἐν πλθοῖς συντιθεμένοις malim. | καὶ τὰ πηγ. U A Scl Sch; καὶ καταπηγνύμενα M. | ἐκ τῶν Hns; ἐξ ὧν U M A; *parte sua superna* G. | ἐβλάστησαν Hns;-σεν U M A Scl. | μετὰ τὸν U (et Sch-auct); κατὰ τὸν A Scl Hns; πρὸς τὸν Sch-txt (postea rejectum); *quo suos partus tueri augereque ualerent* G. | καταξηρένεται (-παίν-rec. manu) U; et pereunt add. G. |

οἱ βλαστοὶ τῆς ὥρας καθηκούσης· ὅτε δὲ καὶ τὰ πηγνύμενα κλήματα καὶ κράδαι καὶ χαράκες ἐκ τῶν ἄνωθεν ἐβλάστησαν ὅσον εἰς ἀρχήν, κάτωθεν δὲ οὐκ ἐρριζώθησαν, ὥς ἔχοντα μὲν ἐν ἑαυτοῖς ἤδη τὰς ἀρχὰς καὶ τὰς δυνάμεις, τροφῆς δὲ δεόμενα μετὰ τὸν τόκον ἥς μὴ γινομένης καταξηραίνεται.

(10) διὸ καὶ οὐκ εἰκάσιν κακῶς λέγειν οἱ φάσκοντες εὐθὺς ἀνθεῖν τοὺς νέους καρποὺς ἔτι τῶν ἐτέρων ἐπόντων· τοῦτο γὰρ δῆλον ὥς δυνάμει λέγουσιν. τὰς μὲν οὖν αὐξήσεις εἴη μὲν ἂν ἀμφοτέρως συμβαίνειν, οὐ μὴν ἀλλὰ διὰ ταῦτά γε μᾶλλον ἂν τις ὄλων τῶν δένδρων <ῆ> μεριζομένας ὑπολαμβάνου γίνεσθαι.

XIII. Ζητήσῃ δ' ἂν τις ἐκ τῶν μικρῷ πρότερον εἰρημένων πότερον τὰ δένδρα κατὰ χειμῶνα κύει πρὸς καρπογονίαν, τοῦ δ' ἥρος ἀποτίκτει καὶ τοῦθ' οἶον περίοδος ἐστὶ χρόνοις ὠρισμένοις καθάπερ τοῖς ζώοις ἢ διὰ τὴν ἔνδειαν τῆς τροφῆς συμβαίνει καὶ διὰ τὴν ψυχρότητα τοῦ ἀέρος. εἰ γὰρ ἐν τοῖς εὐδεινοῖς καὶ μαλακοῖς αἰεὶ βλαστάνουσιν, οὐκ ἂν εἴη τεταγμένη [ἐν] τοῖς χρόνοις ἡ κήσις, εἰ δὲ μὴ οὕτι γε ταύταις ταῖς ὥραις ὥς ὄλον ἅμα βλαστάνειν πάλιν καὶ εἴ τι τὸ ὀργῶν ἀποτίκτειν. (2) εἰ δὲ καὶ συνεχῶς ὁ ἄηρ ἀκολουθοίη τοῖς τοῖς ἴσως οὐδὲ τὰ παρὰ τῶν ποιητῶν λεγόμενα δόξειεν ἂν ἀλόγως ἔχειν οὐδ' ὥς Ἐμπεδοκλῆς αἰεφυλλα καὶ ἐμπεδοκαρπὰ φησι

10. καρποὺς <ὑπισχνέσθαι> ἔτι (temere e G: sponderi) . . . ἐπόντων Hns Sch-txt qui ἀνθοῦντας pro ἀνθεῖν τοὺς habet); at textum veterem restituit Sch-cur.sec. | ἐτέρων: primis nondum semotis G. | ὥς δυνάμει U (et "ὥς non οὐ" Scl in Comm.); οὐ δυνάμει M A; δηλοῦν τὰς δυνάμεις Hns; Hoc enim vires: arborem non deficere significatur. G. | τὰς μὲν corr. Hns et Dlc; ὥς μὲν U M A Scl; Igitur incrementa utraque ratione fieri possint. G. | εἴη μὲν U M; μὲν om. A Hns. | <ῆ> Sch de suo; om. U A Hns etc. | μεριζομένας ἢ ὄλων τ. δ. ὑπολ. maluit Sch; μεριζ. om. G.

1. Ζητήσῃ Hns. | εἰρημένον U. | πρὸς καρπογονίαν om. G. | ὠρισμένοις U Scl Hns Sch; ὀρισ. A; "ὠρισμένη fortasse fuit, ut sequitur τεταγμένη τοῖς χρόν. κήσις" Sch-ann. | ψυχρότητα: rigore G. (pro frigore?). | οὐκ ἂν εἴη corr. Sch; ο. ἀ. ἦν A Hns; ο. ἀ. ἦ M (et forte U, sed totum erasum est et incerte rescriptum). τεταγ. [ἐν] Sch cum mrg-Vsc; ἐν habent U A Hns; partus certis temporibus tribui haudquaquam oportere appareat. G. | οὔτεγε (primo ε linea obliqua notato) U. | ἅμαβλαστάνειν Wmr (separatim in ed-Did).

2. εἰ δὲ καὶ corr. Scl; εἴ τε κ. A; κ. εἴ τε U M; quodsi G. | δόξειεν ἂν ἀλόγως corr. Scl (cum G: ratione non carere appareant); δ. ἀναλόγως U M A Hns. | θάλλειν: βάλλειν Scl 53. 2. B. (mendum). | ἡέρα corr. Hns; ἡρα U M A. | οὐδ' Ἐμπεδοκλῆς . . . κοινὴν: neque illud absurdum sit: quod empedocles inquit:

on, the buds open up before the roots grow. Sometimes cuttings of vine,¹³ fig, or olive fixed in the ground have budded at the top so much as to make a beginning of growth though they were not rooted below. This would indicate that such plants are already in possession of the vital elements and capacities. After they have thus come forth, however, they need food; and when this fails them, they dry up.

It would appear then that they are right who claim that the flowers of the new fruits appear straightway while the old ones are still on;¹⁴ for in speaking of this phenomenon they clearly refer to the plant's capacity. Growth then might be said to happen in either of the ways described; but still we may very properly conclude that it is much more true of the tree as a whole than of its parts separately.

XIII

From¹ what was said just a short time ago one might well ask whether trees in winter are, as it were, pregnant with fruit, and then bring forth in spring. One might ask also, as of animals, what is their period of gestation. Or is this condition the result of lack of food and the coldness of the air? For if in mild and favorable conditions trees keep budding forth continually, their "conception" would not seem to be regulated by the seasons, but, not being limited to these periods, the whole plant at the same time again germinates and brings forth that with which it is teeming.

But if the climate should continually favor them, then the words of the poets would not seem irrational, nor would the statement of Empedocles who, presupposing a condition of climate similar to that in spring, says that evergreens and con-

¹³ C. 5. 1. 4.

¹⁴ H. 8. 2. 5; C. 4. 10. 3; C. 5. 2. 5.

¹ On this section see Hindenlang, p. 70 f.

θάλλειν “καρπῶν ἀφρονήσι κατ’ ἡέρα πάντ’ ἐνιαυτόν,” ὑποτιθέμενός τινα τοῦ ἀέρος κρᾶσιν τὴν ἡρινὴν κοινήν· ἐκείνο δ’ ἂν τις ἴσως ἐν τούτοις ἀπορήσειε πότερα καὶ πεπάνσεις ὅμοιαι τῶν καρπῶν ἢ ἐνδέσσεται γίνονται ἀσθενεστέρου ὄντος τοῦ θερμοῦ καὶ τῆς ὥρας ὑγροτέρας. τοῦτο μὲν οὖν ὥς καθ’ ὑπόθεσιν θεωρεῖσθω.

(3) ἐν δὲ τῇ νῦν περιόδῳ τῶν ὥρων ἔοικε τὰ δένδρα κενωθέντα τοῦ θέρους ἐκ τῆς βλαστήσεως καὶ τῆς καρπογονίας ἀντιπληροῦσθαι πάλιν εἴτ’ ἐκ ταύτης τῆς ἀντιπεριστάσεως ἀποτίκτειν καὶ βλαστάνειν κατὰ τοὺς ἰκνουμένους καιροὺς, ἔχοντά πως τὴν κύησιν καὶ ἐν τοῖς μέρεσι καὶ ἐν τοῖς ὅλοις. εὐλόγως δὲ καὶ αἱ φυτεῖαι καὶ αἱ ἐπιβλαστήσεις γίνονται κατὰ πλείους ὥρας, δοκοῦσι δ’ ἐναντία πως εἶναι μετόπωρόν τε καὶ ἔαρ καὶ κυνὸς ἐπιτολή· ἢ γὰρ περὶ τροπὰς βραχεῖα, ἀλλὰ μετ’ ἀρχτοῦρον ἐπιβλαστάνει πλείω καὶ ὑπὸ κύνα.

(4) τὸ μὲν οὖν ἔαρ οὐδὲ θαυμάζεται, ζωτικωτάτη γὰρ ἡ ὥρα καὶ μάλιστα γόνιμος, ὑγρά τις οὖσα καὶ θερμή. τὸ δὲ θέρος ὥσπερ ἐναντίον· ξηρά τε γὰρ καὶ ἐμπυρωτάτη καὶ μάλιστα ὑπὸ τὸ ἄστρον. ἔτι δὲ τὸ μετόπωρον οὐ μόνον ξηρόν, ἀλλὰ καὶ ψυχρόν ἤδη μεταβάλλον ἐπιλαμβανούσης τῆς ὥρας· ἐναντιωτάτη δὲ βλαστήσει ψυχρότης καὶ ξηρότης. ἀλογία μὲν γὰρ δὴ τις φαίνεται διὰ τούτων. οὐ μὲν οὔτε πρὸς τὰς βλαστήσεις ἐναντία ταυτὰ ἔστιν οὔτε αὖ ἀσύμφωνα κατὰ τὰς δυνάμεις ἀλλ’ ἔχοντά τινα ὁμοιότητα. (5) δεῖ γὰρ δὴ τὴν ὥραν ὑγρότητά τινα καὶ θερμότητα ἔχειν

perpetuis foliis et toto fructibus anno ubertate uigent G. | οὐδ’ ὥς suspicatus est Sch, cui “*concinuitas οὐδ’ ἂν videtur desiderare*,” (*neque . . . quod* G) et qui alterum οὐδ’ ante ὥς abesse maluit. | ὑποτιθέμενος . . . κοινήν om. G. | ἐκείνο U A; ἐκεῖνα M. | ἀπορήσειε πότερα A; ζητήσειε πρότερον mrg-Vsc. | θεωρεῖσθω U A Scl Hns; θεωρήσθω Sch-txt (“*e more Theophrasteo*”).

3. νῦν om. G (*temporum autem circuitu solito arbores*, etc.). | καρπογονίας: καρποτοκίας mrg-Vsc. | ἀντιπληροῦσθαι: *repleri: restituique* G, unde ἀντιπεριστᾶσθαι addere voluit Dlc, sed ἀντικαθίστασθαι maluit Sch. | ἀντιπεριστάσεως: *restitutione* G. | κατὰ τοὺς ix: corr. Sch (e G: *temporibus congruis*) cum Dlc et mrg-Vsc; καὶ τ. i. U A Hns. | ἔχοντα U M; ἔχοντας A Hns. | καὶ ἐν τοῖς A; καὶ τοῖς U M. | αἱ ἐπιβλαστήσεις A; αἱ om. U M. | γίνονται U M; γίγν. A Hns Sch-txt. | δ’ ἐναντία πως A Hns; δὲ ἐναντίαν ὥς U. | κοινὸς (in κυν. erasum) U. | ἢ γὰρ U M Hns; εἰ γὰρ A Scl (qui lectionem defendit: “*Quia non statuit tamquam ita sit; sed accipit cum condicione*.”); *quod enim aggerminetur solstitiis minimum* G. | περὶ Sch cum mrg-Vsc; ἐπὶ U A Scl Hns; *solstitiis* G.

tinuously fruiting plants are exuberant "in their abundance of fruit throughout the whole year with fine weather." There might be doubt also as to whether the ripening of the fruits is the same at all seasons or whether they are sometimes inferior because the warmth is insufficient and the season too moist.

This² now should be regarded as stated merely by way of supposition. In the course of the seasons as they are now, however, it seems that the trees, as a consequence of their budding and fruit-bearing, having been emptied during the summer, are filled up again. Then, from this reciprocal replacement, they bring forth and bud, as the season comes on, having their "conception" somehow in their parts as well as in the whole plant. This is borne out by the fact that planting and supergermination can take place at several seasons. Somehow, fall, spring, and dog days seem to be mutually opposed; for there is little supergermination at the solstice, but more after the rising of Arcturus and in dog days.

So far as spring is concerned, there is nothing to be wondered at; for that season, being moist and warm, is the fullest of life and generation. But summer is, as it were, its opposite; for it is dry and most full of fire,³ especially in dog days. Furthermore fall is not only dry but also cold, for the climate is changing with the approach of winter. Cold and dryness are the greatest enemies of germination. A certain inconsistency here appears in Nature; for neither are these seasons opposed to germination nor are they discordant in their powers. They even have a sort of similarity.

² *I.e.*, presupposition of perpetually spring-like conditions.

³ And as such it is opposed to the moist "element."

4. οὐδὲ θαυμ. A; οὐ θαυμ. Sch-ann ubi alterum membrum elaspsum suspicatur. | ὑγρὰ τις A Hns Wmr; ὑγρὰ τε U M Sch; *utpote quod humidum* G. | ὥσπερ A Scl; ὥσπερ U; ὡς περὶ M; *contraria quasi ueri* G (pro: ὥσπερ ἦρι ἐναντ.?). | ἐμπυρωτάτη U Sch; ἐμπυρωτ. A Scl Hns Wmr. | ἥδη . . . ὥρας: *aere iam immutato: temporis hyberni accessu* G, (unde χειμῶνος addere voluit Dlc). | μὲν [γάρ] Sch ("cum G: *Igitur temeritas quaedam . . . appareat.*").

ὥσπερ καὶ τὸ ἔαρ. αὕτη μὲν ὁμολογουμένη μάλιστα πρὸς βλάστησιν.

ἐν ἀμφοῖν δὲ τοῦτο συμβαίνει καὶ ἐν τῇ τοῦ κυνὸς ἐπιτολῇ καὶ μετ' ἀρκτοῦρον· ὑπὸ γὰρ αὐτὸ τὸ ἄστρον καίπερ ὄντος ἐμπύρου τοῦ ἀέρος ὁμῶς καὶ νότια πνεῖ καὶ νέφη συνίσταται καὶ αὐτὰ τὰ δένδρα διυγραίνεται φανερώς καὶ ὑπὸ τὸν φλοιὸν αὐτῶν διαδίδοται τις ὑγρότης, ὅθεν καὶ ῥοαί τισι κατὰ τοῦτον τὸν καιρὸν εἴτ' οὖν συνελαυνόμενου τοῦ ὑγροῦ καὶ ἀντιπεριστάσεως γινομένης εἴτε δι' ἄλλην αἰτίαν.

(6) πλὴν συμβαίνει γε τοῦτο καὶ τοῖς ἀνθρώποις, διὸ καὶ αἰκοιλίαι μάλιστα λύονται καὶ πυρετοὶ πολλοὶ γίνονται καθυγραינוμένων τῶν σωμάτων. δοκεῖ δὲ καὶ ἡ γῆ τότε καθυγρανθῆαι μᾶλλον ὅθεν καὶ ὑδάτων ἀναδόσεις καὶ ἔτεροι μεταβολαὶ γίνονται πλείους. ἀλλὰ δι' ἣν μὲν αἰτίαν ἕκαστα συμβαίνει τούτων ἕτερος λόγος· ὅτι δὲ ἐξυγραינוμένων τῶν φυτῶν καὶ τοῦ ἔξωθεν ἀέρος οὐκ ἀντιπίπτοντος ἢ ἐπιβλάστησις οὐκ ἄλογος φανερόν ἐκ τῶν εἰρημένων.

(7) τὸ δὲ μετόπωρον οὐχ ὥσπερ ἐλέχθη ξηρὸν καὶ ψυχρὸν ἐστίν, ἀλλὰ μᾶλλον θερμόν· ἅμα γὰρ ἐν τῇ τοῦ ἄστρου μεταβολῇ ἐν τῷ ἀέρι γίνεται, διὸ καὶ ὥσπερ μίξιν τινὰ συμβαίνει γίνεσθαι τοῦ ὑγροῦ καὶ τοῦ θερμοῦ καθάπερ καὶ ἐν τῷ ἥρι προσγίνεται τὸ θερμόν ἀπὸ τῆς ὥρας. ἐνταῦθα δὲ τοῦ θερμοῦ προϋπάρχοντος ὑγρότης ἐπιγίνεται διὰ τὴν πύκνωσιν καὶ κατὰψυξιν τοῦ ἀέρος.

5. ἐπιτολῇ καὶ μετ' corr. Scl (e G: *et post arcturum*); καὶ om. U A. | καίπερ ὄντος U M et correxerat Scl (e G: *quamquam plurimum ferueat*); καὶ παρόντος A Hns. | τοῦ ἀέρος om. G. | ῥοαί corr. Scl; ῥοαί U M A Hns. | τισι κατὰ conj. Wmr: καὶ κατὰ U M; κατὰ A Scl Hns Sch-txt; *quamobrem eo quoque tempore conflauit alimenti citatur*. G. | εἴτ' οὖν A Scl Hns; ἢ τ' οὖν U M; *sive* G.

6. καὶ αἰκοιλίαι Sch; αἰκοιλ. κ. U M; καὶ κοιλ. A Hns; *et hinc alui* G. | ἀναδόσεις Wmr; ἀναδώσεις (in-dō-eras.) U; ἀναδύσεις A Scl Hns Sch; *aquae proinde emergunt* G. | ἄτεροι (in ēt-eras.) U.

7. ἅμα γὰρ Wmr; ἅμα δὲ U A Scl Hns Sch. | [ἐν] Sch. | μεταβολῇ corr. Wmr; μεταβολῇ U A Hns Sch. | ὑγρότης post μεταβολῇ Hns; *et simul ac syderis facta mutatio sit: aer humidus satis redditur* G. | τοῦ θερμοῦ U M; τοῦ om. A Scl Hns. | ἀπὸ τῆς ὥρας A; *a sequente aestate* G. | ἐνταῦθα . . . ἀέρος: *etenim autumnno caloris progressae aestatis aliquid extat. Humiditas autem recens accedit: scilicet ob densitatem: refrigerationemque aeris*. G.

For the season must have a certain moisture and warmth as does also the spring. This latter, it is agreed, is most favorable to germination. But in both the other seasons this happens, not only at the rising of the Dog Star⁴ but also after Arcturus.⁵ For in the very midst of dog days, though the air is torrid, still southerly winds blow and clouds arise and the trees themselves seem to be thoroughly soaked.⁶ A certain amount of moisture is distributed under their bark, causing in some trees a flowing of sap during this period, either because the moisture is collected and reciprocal pressure arises, or for some other reason.

Moreover this happens also to human beings; wherefore they have violent purgings and numerous attacks of fever, because of the excess⁷ of moisture in their bodies. It seems that the earth, too, at that time is much more saturated with moisture, which causes bursting⁸ forth of streams and numerous other changes. What causes each of these phenomena is a different problem; but from what has been said it is clearly not unreasonable that plants should supergerminate when they are full of water and when the surrounding atmosphere offers no obstacles.

Autumn⁹ however is not, as has been said, altogether dry and cold; rather it is warm. For, as soon as the season changes from that of the Dog Star, there is a change too in the air, resulting in a sort of mixture of the moist and the warm, just as when in spring the heat begins to increase with the advancing season. In autumn, on the other hand, while the heat lasts over, there is also an accretion of moisture from the condensation and chilling of the air.

⁴ Summer; H. 4. 2. 4.

⁵ Fall; C. 3. 2. 7.

⁶ C. 5. 9. 2.

⁷ On this meaning of the verb see C.6. 18. 10 (L. and S.).

⁸ C. 2. 1. 4.

⁹ We are now to hear the point of view of Th. himself, quietly advancing, as often, a more reasonable explanation in place of some accepted dogma of his day. On Th.'s method see Greene: Chap. II, *passim*, especially *Transmutation*, page 135 ff. Compare also Chaps. 21 and 22 of this book.

(8) εὐλογον δὲ καὶ τὰ μὴ κάρπιμα καὶ ὅλως τὰ νέα τῶν πρεσβυτέρων ἐπιβλαστικώτερα, καὶ τὰ ἐν ταῖς ὑγραῖς καὶ χειμερίοις χώραις. τὰ μὲν γὰρ κάρπιμα καὶ πρεσβύτερα ξηρότερα, τὰ μὲν εἰς τοὺς καρποὺς κατανηλωκότα, τὰ δὲ καὶ τῇ φύσει τοιαῦτα. τὰ δὲ ἄκαρπα καὶ νέα καὶ ὑγρότητα ἔχει καὶ θερμότητα πλείω. πάλιν δὲ ὅπου μὲν οἱ τόποι χειμέριοι καὶ ὑγροὶ τυγχάνουσι καὶ ὁ ἀήρ εὐπνοὺς ἐνταῦθα καὶ τὰ μετοπωρινὰ γίνεται μακρὰ καὶ ὑγρά καὶ καλὰ. πολλάκις δὲ καὶ ὕδατα θερινὰ κατὰ γε τὰς πλείστας, ὥσθ' ὑγροῦ τοῦ ἀέρος ὄντος ἐπιγινομένης θερμῆς εὐβλαστότερα γίνεται καὶ εὐαυξή μᾶλλον. (9) ἐπεὶ καὶ τὰ δοκοῦντα δικαρπεῖν μηλειῶν τέτινα γένη καὶ ἀπίων ἐν τούτοις μάλιστα γίνεται τοῖς τόποις ἅτε παρεκτεινούσης ἐπὶ πολὺ τῆς ὥρας. καὶ ταχὺ τῶν προτέρων ἀφαιρουμένων ἃ μὴ πρωϊκαρπεῖ ὅμως διαφορεῖ. θᾶττον γὰρ πάλιν ἀναπληροῦνται <καὶ κυῖσκονται>, διὸ καὶ χρῶνται τινες αὐτῷ τῶν πρὸς τὴν ἀγορὰν βλεπόντων. οὐ μὴν ἀλλ' οὐδὲν γε ὥς εἰπεῖν τῶν δικαρπούντων ὅμοιον γίνεται τοῖς ἐξ ἀρχῆς ἀλλ' ὥς ὀρμὴν μόνον τοῦ φυτοῦ λαμβάνοντος, οὐ συνεκτελέσαντος δὲ τοῦ ἡλίου καὶ τοῦ ἀέρος.

8. εὐλογον Wmr; εὐλόγως U A Scl Hns Sch; *recte et aequè* G. | τῶν καρπίμων ante τῶν πρεσβυτέρων addere vult mrg-Vsc. | χώραις corr. Scl (cf. G: *locis*); ὥραις U A Hns. | κατανηλωκότα U M Wmr; κατανηλωκότα A Hns Sch-txt. | τὴν ὑγρότητα post κατανηλ. addere voluit Sch-cur.sec. ("e G"); *quoniam altera humores suos ad fructificandum absumunt*. G. | ὑγ. ἔχ. κ. θερμ. A Hns Scl; ὑγ. κ. θερμ. ἔχ. Sch; ὑγ. ἔχ. κ. θερμ. ἔχει U. | τοιαῦτα: *non nisi sicca constare necesse est*. G. | εὐπνοὺς U A Scl Hns; ἄπνοὺς M; *flatusque commodi non desint* G. | κατὰ . . . πλείστας: ὥρας intell. Scl; χώρας Sch, cum G: *plurimis* . . . *locis*. | ἐπιγινομένης θερμῆς conj. Sch-auct; ἐπιγ. ἐτέρως U M (pro ἐτέρας?); ἐπιγινομένου ἐτέρου A Scl Hns Sch-txt; om. G. | εὐαυξή A Hns; εὐαξή U M.

9. τὸν δοκοῦντα M. | δικαρπεῖν U (et corr. Scl); διακαρπεῖν A Hns; *bifera esse* G. | μηλειῶν U. | τέτινα γένη U; *τίνες καὶ κτλ.* Sch-txt (cum mrg-Vsc); γένη om. A Hns; *genera quaedam* G. | παρεκτεινούσης corr. Sch (e G: *cum tempus* . . . *protrahat*); παρεμπιπτούσης U A Scl Hns. | <ἐστίν> ἃ καὶ Sch solus. | ἃ μὴ πρωϊκαρπεῖ Wmr; ὃ καὶ πρ'εῖν U M; ἃ καὶ πρ'όντα A Scl Hns Sch-txt. ὅμως U A Scl Hns Wmr; ὁμοίως Sch-txt. | διαφορεῖ Sch; διαφέρει U A Scl Hns. | ἀναπληροῦνται Wmr; <καὶ κυῖσκονται> Sch-auct; ἀναπληροῦνται διὸ . . . ἀγορὰν βλεπόντων καὶ κυῖσκονται τινες αὐτῶν πρὸς τὴν ὥραν βλεπόντων οὐ μὴν κτλ. U A Scl Hns Sch-txt; χρῶνται τινες τοῦτῳ τῷ τρόπῳ τῶν πρὸς τὴν ἀγορὰν οὐ πρὸς τὴν ὥραν βλεπόντων conj. Sch-auct; "*Quae inter haec*" (i. e. ἀναπληροῦνται et

It is logical that sterile trees, and in general young trees rather than old ones, should be more given to super-budding, as should also those that grow in moist and cool spots. For fruiting and older trees are drier, the former because they have expended their moisture on their fruits, the other because they are so by nature.¹⁰ But barren trees and young ones have both more moisture and more warmth. If again they happen to grow in moist or cool places, and where favorable winds blow, and the autumns are long and moist, the trees will be fine. Often too the summer rains are very frequent so that, when the air is moist and there is heat accumulated, the trees are rendered much more ready to bud and grow.

Moreover trees that appear to have fruit twice a year (as do some kinds of apple and pear¹¹) bear especially well in these places, inasmuch as the season is so prolonged. When the first fruits are quickly plucked,¹² even trees that are not early bearers still produce twice a season; for they fill up again the more quickly and become, as it were, with fruit, for which reason this process is employed by those with an eye to the market. Nevertheless the later fruit of these trees that bear twice in the same year is almost never like the early fruit, since it has received only the generating impulse but not the sun and air to bring the fruit to perfect maturity.

¹⁰ Perhaps, because they have spent it in growth.

¹¹ On a different type of double bearing, see H. 3. 4. 5.

¹² I. e., as soon as ripe or nearly so; cf. C. 2. 8. 2.

οὐδὲν τῶν δικαρπύων) "intersunt verba valde obscura sunt." Scl 57. 1. A. | οὐ μὴν γε, ἀλλ' . . . δικαρπύων M (ap. Sch). | δικαρπύων corr. Scl (e G: quae secundo fructificentur); δι/καρπύων (rasura inter δι et κ) U; διακαρπ. A Hns. | ἐξ ἀρχῆς Sch; ἐξαρχῆς U A Scl Hns. | δὲ τοῦ ἡλίου U; δὲ om. A Scl Hns Sch-txt. | quod etiam fructus prouentu celerem dixeris. Veruntamen refert: quamprimum enim arbor repletur: qua de causa fructus eadem alios perfectus iam usui praestat: alios concipit parturitue. Caeterarum nihil fere ex his quae secundo fructificantur: simile primis perficitur. Sed quoniam una cum plantae impetu: solis quoque: et aeris opera: non adfuerit: iccirco omnia deteriora redduntur. G.

(10) καὶ ἐφ' ἐτέρων ἔτι μᾶλλον συμβαίνει· προφαίνει γὰρ καρπὸν καὶ ἡ ῥόα καὶ ἡ μύρρινος ἀλλὰ μέχρι τοῦ προδείξαι μόνον. ἐπιβλαστικώτατα δ' οὖν ὡς εἰπεῖν τὰ μάλιστα εὐβλαστῇ τῇ φύσει, πλὴν εἴ τι διὰ ξηρότητα κατακωλύεται καθάπερ ἡ ἀμυγδαλὴ καὶ εἴ τινων ὑπόγειος ἡ ἀφαίρεσις τῶν καρπῶν πρὸς τῆς ὥρας ἐπιβλάστησιν.

(11) εἰάν οὖν μακρὸν γίνηται τὸ μετόπωρον οὐκ ἄλογον καὶ ῥόδα γίνεσθαι καὶ ἄλλ' ἄττα τῶν τοιούτων ὥσπερ καὶ περὶ Δίον φασὶ τῆς Μακεδονίας οὐκ ἰσχυρὰς γε δεόμενα τῆς πέψεως χρόνον δὲ λαβόντα ἱκανὸν ἐξέφηνε τὸ ἄνθος. ὅλως δὲ ὁ πλεονάκις εἴρηται μαλακοῦ καὶ ὑγροῦ τοῦ ἀέρος καὶ τὸ σύνολον εὐκράτου ἀεὶ δύνατον βλαστάνειν οὐ πάντα, ἀλλ' ἔνια τῶν δένδρων τὰ δ' ἐλάττω τούτων ἔτι μᾶλλον. ὁ καὶ νῦν ἐπὶ τινων στεφανωμάτων συμβαίνει τόπους ἐχόντων εὐσκεπεῖς καὶ προσείλους.

(12) διατελεῖν γὰρ ἀνθοῦντα δοκεῖ καὶ ἡ οἰνάνθη καὶ τὸ ἶον τὸ μέλαν καὶ ἄλλ' ἄττα, θεραπείας δὲ τινος προσγενομένης ἔτι μᾶλλον. ὅτι δὲ μεγάλην ῥοπήν ὁ τόπος παρέχεται πρόσειλος ὢν καὶ εὐσκεπῆς καὶ αὐτὰ τὰ δένδρα μαρτυρεῖ· φύεται γὰρ ἐν τούτοις ἔνια κατὰ τὴν ἄλλην χώραν οὐ φυόμενα καὶ καρποφορεῖ τῶν ἄλλων οὐ φερόντων καὶ προανθεῖ καὶ προβλαστάνει πρότερον τῶν λοιπῶν. ὑπὲρ μὲν οὖν τούτων ἱκανῶς εἰρήσθω.

10. προφαίνει: ostendit . . . fructum secundum G. | ἀλλὰ . . . προδείξαι: sed augere nullatenus possunt G. | ἐπιβλαστικώτατα corr. Sch-syl (ἐμβλ. txt); ἔπειτα βλαστικώτατα: βλαστικώτατα U M; ἐπεὶ καὶ βλ., βλ. A Scl (alterum βλ. om. Hns); Igitur propensiora ad supergerminandum G. | δ' οὖν U M A; γ οὖν Scl Hns Sch-txt. | εὐβλαστῇ U (et correxerat Sch); εὐλαβῇ M; εὐανξῇ A Scl Hns; quae . . . facile affici possint G. | κατακωλύεται corr. Wmrg; καὶ κωλύεται U M; κωλύεται A Hns Sch-txt. | καθάπερ καὶ ἡ U. | ὑπόγειος corr. Scl (et hab. Hns); ὑπόγνος U; ὑπόγειος A; εἴ τινος ὑπόγειος M; proximior G. | πρὸς . . . ἐπιβλάστησιν: quam ut tempus germinare germina valeat G.

11. μακρὸν: proluxior G. | περιδίων U; περὶ δίον A;—Δίαν (Dian in vers.) Hns;—Dion G. | ἰσχυρὰς corr. Sch (e G: coctione uehementior non egeant); ἰσχυρῶς U A Scl Hns. | προσείλους Sch cum M, quod habet forte U sed non clarum (-ει- in -ή- rec. manu mutatum?); προσήλους A Scl ("alibi ἐρηλος"); προσηλούς Hns.

12. πρόσειλος U (?) M Sch; πρόσηλος A; ὑπόηλος Hns. | προανθεῖ κτλ.: "πρωῖανθεῖ κ. βλαστάνει scriptum fuisse videtur" Wimmero (Consp. Script.)

In other trees this is even more true. For the pomegranate and the myrtle produce a second crop; but with them it amounts only to a show of fruit.¹³

The trees therefore that in general are most inclined to super-germination are those that are most productive by nature, except when one of them is hindered by drought (as for instance in the almond), or when the first fruit is plucked too late for the tree to bear again that season.

Now if there is a late autumn, we might expect even roses and other similar plants to come out, just as is said to have happened near Dium¹⁴ in Macedonia; for these plants, not requiring vigorous ripening, had time enough to show forth a second growth of flowers. But in general, as has often been stated, when the climate is mild and moist and altogether temperate, regrowth may be expected. This occurs, however, not in all trees but only in certain ones; and the smaller the trees the more we may look for it, as now it occurs in some of the coronaries if they are in well protected and sunny situations.¹⁵ For it seems that drop-wort¹⁶ and sweet violet¹⁷ and other such plants keep right on flowering especially when they receive a little additional cultivation. That their situation, when it is sunny and protected, exerts a great influence is proven by the trees themselves. For in such a situation some trees grow that will grow nowhere else; others will fruit there, whereas elsewhere they are sterile; still others will bud and flower earlier there than they will anywhere else. Now concerning these let this statement suffice.

¹³ *I.e.*, without perfecting it.

¹⁴ There were in Macedonia two cities of this name, one on the Thermaic Gulf near Mt. Olympus (Strabo p. 330, frags. 17, 18, 20, 21), the other in Chalcidice on the Strymonic Gulf near Mt. Athos (Strabo p. 331, frags. 33, 35.) Stagirus is not far from the latter. Cf. H. 3. 5. 4.

¹⁵ H. 4. 1. 1, etc.

¹⁶ *Spiraea filipendula* (Th-D *ap.* Hort); cf. H. 6. 6. 11; H. 6. 8. 1, 2; *Enc. Brit.* 8-591 a and 23-722 d.

¹⁷ *Viola odorata* (Th-D *ap.* Hort); H. 1. 13. 2; H. 6. 6. 3; H. 6. 6. 7; H. 6. 8. 1, 2; Gray p. 585.

XIV. Τὸ δ' ἐπὶ τῶν διαφορούντων δένδρων ὁμοῖον τινα τρόπον ἐστὶ τῷ ἐπὶ τῶν προβάτων γινομένῳ· ἐκεῖνα γὰρ εὐτοκήσαντα καὶ εὐγονούντα πάλιν ὁρμῇ πρὸς κήσιν ἐκποιούσης ἔτι τῆς ὥρας. καὶ τὰ δένδρα παραιρέθωντων τῶν πρώτων καρπῶν γονεῦει πάλιν ἐτέρους, δεῖται δ' ἴσως χώρας τε εὐτρόφου τὰ τοιαῦτα τῆς τε θεραπείας πλείονος [ἢ] ἀμφοῖν καὶ μάλισθ' ὥς εἰπεῖν τῆς τοῦ ἀέρος κράσεως ὅπως λάβῃ χρόνον ἱκανὸν εἰς τὴν κήσιν. (2) διὰ τοῦτο γὰρ οὐδ' ἐάν τις ἀφέλῃ τὸν καρπὸν ἢ ἄνθος, δύναται πάλιν ἕτερα γεννᾶν διὰ τὸ μὴ λαμβάνειν τὸν τῆς κησέως χρόνον· οὐ γὰρ οἶον τε ἄνευ τοῦ κηῆσαι γεννᾶν ἐξαηλωμένου τοῦ προϋπάρχοντος. ἅμα δὲ ὥσπερ πηροῦσθαι συμβαίνει τὴν ἀρχὴν διὰ τὴν ἔλκωσιν, ὥστε βλαστάνειν ἀπὸ τούτου μὴ καινῆς ἄλλης γινομένης οὐκ ἐκποιεῖ τὸ τῆς ὥρας· τούτων μὲν οὖν οὕτως ταύτας ὑποληπτέον τὰς αἰτίας.

(3) αἱ δὲ πεπάνσεις τῶν καρπῶν οὐ κατὰ τὰς βλαστήσεις γίνονται· βλαστάνει γὰρ τὰ γε πολλὰ σύνεγγυς αὐτοῖς κατὰ μίαν ὥς εἰπεῖν ὥραν· τοῦ δὲ πεπαίνειν τοὺς καρποὺς πολλοῖς χρόνοις ὕστερον ἐκείνην τὴν αἰτίαν ὑποληπτέον, ὅτι <τὰ> μὲν τῶν φύλλων καὶ βλαστῶν εὐκίνητότερα καὶ ῥέονα σωματικωτέραν ἔχοντα καὶ περιττωματικὴν τὴν ὕλην, οἱ δὲ καρποὶ καθαρωτέραν καὶ μάλιστα δὴ τῶν χυλῶν αὐτῶν· αὕτη δ' ἡ τῶν καρπῶν

1. διαφορούντων corr. Sch cum mrg-Vsc; διαφορούντων U; διαφερόντων A; διφόρων vel διεφρόντων conj. Scl; διαφερόντων Hns; (fortasse τῶν διφόρων τῶν δένδρων scripsit Th.); *biferis* G. | γινομένῳ M; γινόμενον U; γενόμενον A Hns. | ὁρμῇ (pro ὁρμῇ) mrg-Vsc. | πρὸς κήσιν U A Hns Sch; προσκύνειν M; τὴν inseruit Wmr. | ἐκποιούσης A Scl Hns; ἐμποιούσης U; *dimmodo tempus sufficit* G. | παραιρέθωντων (παραι-rec. manu) . . . τῆς θεραπείαι (-as rec. man.) U. | [ἢ] delendum censuit Scl; ἢ ἀμφοῖν om. G. | λάβῃ χρόνον U; λ. τὸν χ. A Scl Hns Sch Wmr.

2. <τὸ> ἄνθος Sch solus. | δύναται A Hns; δύνανται U Sch. | οἶοντ' ἄνευ U solus. | ὥστε βλαστ. corr. Scl; ὥστε μὴ βλαστ. U A Hns. | τούτου μὴ καιν. Wmr; τούτου καιν. U Hns; τούτου καὶ μὴ καιν. Hns; τ. εἰ μὴ καιν. Sch-txt (ταύτου pro τούτου maluit Sch-ann). | ὥστε βλαστ. κτλ.: *ita ut nunquam nisi alio denuo effecto principio: germen emergere possit: quod quidem praesens tempus nequit efficere.* G. | ἐκποιεῖ τὸ Hns; τὸ om. U A. | οὕτως tollendum cens. Sch; om. G.

3. δὲ πεπάνσεις conj. Wmr; δ' ἀνθήσεις U A Scl Hns; δ' ἀνθήσεις καὶ βλαστήσεις οὐ κατὰ τὰς τῶν καρπῶν πεπάνσεις γίνονται. Sch; *Flores autem rationi germinationis haud quaquam respondent.* G. | κατὰ τὰς βλαστ. κτλ. U A Hns. | σύνεγγυς αὐτοῖς om. G. | <τὰ> μὲν τῶν Sch; μὲν τῶν U M; τῶν μὲν A; τὰ τῶν Hns. | ῥέονα Wmr e Sch-ann (cum mrg-Vsc); ῥᾶον ἂν U M A; ῥᾶω ἂν Hns Sch; *facilioraque* G. | τῶν χυλῶν αὐτῶν conj. Wmr; τοὺς χυλοὺς αὐτοὺς U A Hns Sch; *succisque ipsis praecipue perficiantur.* G. | αὕτη . . . εἰς ἣν Sch-ann "e G" (unde Wmr-

XIV

What occurs in twice-bearing trees is similar in a way to what happens in sheep; for they, having brought forth easily and being quite fertile,¹ feel a special impetus to conception if the season of the year is still favorable. And trees, when their early fruits are plucked, conceive others again, but for such functioning they probably need rich soil and more cultivation or both; and most of all, one might say, they need a temperate climatic condition that they may get time enough for their "gestation."

Because a tree has not time to come to full period,² even if one takes away its early fruit or flowers, it cannot again produce others. For without "gestation" it cannot bear, inasmuch as it has spent all its reserve material,³ and, at the same time, the vital impulse is maimed, as it were, by the wound,⁴ so that the season of itself cannot effect germination from such a plant unless a new store of the vital principle is produced. Of these phenomena then the foregoing may be taken as explanations.

But the ripenings of the fruits do not correspond to the times of budding. For most trees bud at very nearly the same time in practically one single season. The fact that the ripening of their fruits comes at much later periods is probably to be explained on the supposition that the leaves and buds are more easily and more quickly stimulated, as they consist of more corporeal and more superfluous stuff;⁵ whereas the fruits, espe-

¹ Ready to conceive again. Conception is supposed to be especially easy just after parturition.

² Varro *R. R.* 1. 44. 4.

³ Arist. *G. A.* 4: Chaps. 4 and 5 *passim*. Aristotle's doctrine (see *inter al.* 729 a) was, briefly, that semen was the actual embryonic material, whereas the secretions of the mother animal simply nourished the developing life received from the father. This harmonizes with and illuminates the point of view expressed in Greek literature, especially in the Drama, that the child is child of the father, for whom the mother merely grows it; cf. Aesch. *Eum.* 678 ff., Eur. *Orest.* 553. Diodorus 1:80 tells of a similar notion among the Egyptians.

⁴ From removing the early fruit?

⁵ Th. means residual and therefore only slightly refined, if at all—useful for nourishment but not for the higher, that is purer and more elaborate structures of reproduction. For a similar notion in the realm of zoology, cf. Arist. *G. A.* 2: 6 (744 b 12 and the context).

πέπανσις εἰς ἣν πλείονος δέϊται καὶ δυνάμεως καὶ κατεργασίας.

(4) ἔτι δὲ μεγάλας εὐθὺς διαφορὰς ἔχουσιν οἱ καρποὶ τῷ ξυλῶδεϊ ἢ γεώδεϊ ἢ ξηροῖ ἢ λιπαροῖ τὴν φύσιν εἶναι. δυσκατεργαστότεροι γὰρ οἱ τοιοῦτοι διὸ καὶ προανθοῦντα ἔνια τὸν καρπὸν ἔχει πολὺν χρόνον ὥσπερ ἀμυγδαλῇ. δυσκατάπεπτος γὰρ ὁ ξυλῶδης· τὸ δ' ἄνθος ὡθεὶ διὰ τὴν πρότερον λεχθεῖσαν αἰτίαν, εἴπερ βούλονται πάντα ταῦτα συμμετρίαν τινὰ ἔχειν καὶ τάξιν. ἀλλὰ καὶ αὐτῶν τῶν ἀνθῶν ὅσα μετὰ σωματικῶν ὄγκων, ὀφιαίτερόν τι γίνεται καθάπερ τὸ τῆς ῥόας· ἐν γὰρ τῷ κυτίνῳ τὸ ἄνθος·

XV. Τὰ δ' ἀργὰ τῶν εἰργασμένων πρωῒβλαστότερα καθάπερ ἄμπελος, μηλέα, ἐλάα, συκῇ, τὰ ἄλλα, διὰ τὸ κατέχειν ἔνια τὴν θερμότητα μᾶλλον μὴ ἀνασκαπτομένης τῆς γῆς μηδὲ γυμνουμένων τῶν ῥιζῶν· αὕτη γὰρ ἢ κινούσα· καὶ διὰ τὸ μηδεμίαν ἐν τοῖς ἄνω γίνεσθαι πληγὴν κλωμένων ἢ καρφολογουμένων· ἀφελκούμενα γὰρ πόνον τε παρέχει καὶ καταψύχει καὶ εἰς ὀλίγον συστέλλει. τοῖς δὲ πολλοῖς διαδίδοται κατὰ μικρά, διὸ

txt) et mrg-Vsc; αὕτη U M A Hns Sch-txt; αὕτη δ' ὑπὸ τῶν M; *quod quidem non aliud quam maturitas fructuum est.* G (pro ἢ δ' αὕτη ?). | καὶ δυνάμεως καὶ U; καὶ δυν. om. M; καὶ δυν. καὶ om. A Hns Sch-txt; *ampliori paratu confectumque opus est* G.

4. γεώδεϊς (in γεώ- eras.) . . . προανθοῦτ' . . . τῶν καρπ. (in τὸν eras.) U. | καρπὸν ἔχει U M; κ. ἔχειν A Hns; *sunt . . . quae . . . retineant* G. | δύσπεπτος Hns Sch; δυσἀπὸσπαστος U M A Scl (qui autem vocab. susp.); δυσκατάπεπτος Wmr; *Erui namque qui ligno constat: difficile admodum potest.* G. | πρότερον U (et habuerant Scl Hns); προτέραν M A. | λεχθῆσαν U. | εἴπερ . . . ἔχειν U (et βάλλονται in βούλονται prima manu mutat.) Sch-syl; εἴπερ βάλλονται ταῦτα πάντα συμμετρίαν ἔχειν M; ὑπερβάλλοντα δὲ ταῦτα . . . ἔχει A Scl Hns Sch-txt; *si quidem ea omnia modum convenientem ordinemque sortiri debeant* G. | μετὰ σωματικῶν U M; μετὰ τῶν σ. A Scl Hns. | τι γιν. U; τι om. A Hns Sch-txt. | κυτίνῳ Scl Hns; κτίνῳ U A. | τὸ ἄνθος A Scl Hns Sch; τῷ ανθ. (in τὸ erasum) U; τῷ ἄνθ. Wmr (mend.); (Fortasse scribendum est: ἐν γὰρ κυτίνῳ τῷ (i. e. τινί) τὸ ἄνθος); ἐν . . . ἄνθος om. G.

1. προῒβλαστ. U. | τὰ ἄλλα corr. Scl; τὰ δ' ἄλλα U A Hns; τὰ τ' ἄλ. Sch-txt; *et reliqua* G. | ἔνια om. G. | γυμνουμένων corr. Scl et hab. Hns; —μένης U M A; *quum non fodiantur: neque radice nudentur* G (fortasse μὴ ἀνασκαπτόμενα τῆς γῆς μηδὲ γυμνούμενα τῶν ῥιζῶν?). | καρφολογουμένων corr. Scl et hab. Sch; καρπολογ. U A Hns Wmr; *fructus decerpentur* G. | ἀφελκούμενα . . . παρέχει A; ἀφελκούμεναι γὰρ πόνον τε γάρ U M; παρέων καὶ (pro παρέχει καὶ) M. | τοῖς δὲ πολλοῖς . . . ὑπακούει om. G; ("membrum διὸ . . . ὑπακούει ad finem rejiciendum

cially in their juices, are of much purer stuff. This maturing of the fruit takes as much time as is needed for this greater expenditure of energy and working-up.

Then too, in certain trees, the fruits themselves differ very greatly in being naturally woody or earthy or dry or "fat"; for such trees are slower in working up the material. Some of them therefore, though they bloom early, keep their fruit for a long time, as for instance the almond. For the woody nature is the hardest of all to bring to maturity,⁶ although the blossom comes out more quickly for the reason given above, since all of these plants strive to have a certain symmetry and order.⁷ Even in the blossoms themselves, those with fleshy swellings⁸ are later in their appearance, as for instance the blossom of the pomegranate, for this flower is a sort of pot-like object.

XV

Certain trees such as the vine, apple, olive, fig, and the like will bud earlier without cultivation than with it, because they retain their warmth better if the earth is not dug up nor their roots exposed (for warmth is the germinating impulse), and also because they are not injured in their upper parts by the breaking off¹ of branches or dry twigs.² For injury to the tree causes it added labor, reduction of heat, and contraction. The majority of trees are supplied with moisture in their smallest parts, and

⁶ Hindenlang (p. 147, note 2) would restore the reading of the MSS and render "*schwer abzutrennen*." It seems to me, however, that the whole context demands some such sense as is given by Wimmer's conjecture—practically the sense of Heinsius.

⁷ Probably Th. means that the blossoms in such trees come before the leaves, in order to balance the fruit's coming so long after.

⁸ Th. may think of this type as looking more like a fruit and therefore needing more maturing. See H. 1. 13. 5.

¹ A rough sort of pruning that might be included under cultivation.

² For fire-wood (see L. and S., *s.v.*). The MSS give "or the plucking of fruit," which, if read, must refer to last year's fruit still on the tree (cf. H.3.4.1, 5, 6; H. 3. 16. 1), a condition scarcely imaginable for the trees cited.

ταῦτα ταῖς ὥραις ὑπακούει, καὶ ἔτι δὴ καὶ μάλισθ' ὥς εἰπεῖν διὰ τὸ ἀκλάστων ὄντων καὶ ἀκαθάρτων ἐν πολλοῖς εἶναι καὶ κατὰ μικρὰ τὰς γονίμους ἀρχάς, ὧν ἕκαστον διὰ τὴν ὀλιγότητα καὶ σμικρὰς δέεται κινήσεως καὶ εὐθὺς ποιεῖται τὰς ἐκβλαστήσεις· ὃ καὶ ἐπὶ τῶν ἀπίων ξυμβαίνει. (2) καὶ γὰρ ἐκεῖνα εὐβλαστότερα τῶν ἡμέρων ἐστὶ διὰ τὰς αὐτὰς αἰτίας· εἰς πλείω γὰρ καὶ κατὰ μικρὰ μεμερισμένων τῶν ἀρχῶν εὐκίνητα γίνεται τῷ περιέχοντι πρὸς βλάστησιν. ἔτι δὲ καὶ ἡ ξηρότης συμβάλλεται. καὶ γὰρ διὰ τοῦτ' ἐλάττων ἡ ὑγρότης, τὸ δὲ ἔλαττον εὐκίνητότερον. καλλίων οὖν καὶ ἄθροωτέρα τῶν εἰργασμένων ἡ βλάστησις καὶ ἡ καρπογονία, προτέρα δ' ἐκείνη.

(3) αὐτὸ δὲ τοῦτ' ἂν τις ἀπορήσειε διὰ τί τὰ ἄγρια τῶν ἡμέρων ἰσχυρότερα ὄντα τοὺς καρποὺς οὐ πεπαίνει· κατὰ γὰρ τὰς δυνάμεις ἔχρῃν καὶ τὰς πέψεις εἶναι. μία μὲν δὴ τις αἰτία τὸ πλῆθος τῶν καρπῶν. οὐ γὰρ τοσοῦτον ὑπερίσχουσι τῷ ἰσχύειν ὅσῳ πλείω τοῦ συμμέτρου τὸν καρπὸν ἴσχουσιν· ἂν δὲ πλῆθος πολὺ κάκειων οὐκέτι γίνεται πέψις, διὸ καὶ οἱ γεωργοὶ παραιροῦσιν, ὅταν ὦσι πλείω. ἑτέρα δ' ὅτι πυκνότερα καὶ ξηρότερα καὶ εἰς ἑαυτὰ μᾶλλον ἔλκοντα τὸ ὑγρὸν, ἡ δὲ τροφή καὶ ἡ πέψις ἐνδόσει τῆς ὑγρότητος ἣν οὐ ῥᾶδιον ἀντισπωμένην λαμβάνειν.

et adverbio θάττον augendum" Sch-auct.). | <ἡ ὑγρότης> post διαδίδοται add. Sch; (*succus* in vers. lat. habet Wmr.) | κατὰ μικρὰ Sch cum mrg-Vsc; καὶ τὰ μ. U A Hns. | ταῦτα corr. Scl; ταύταις U A Hns. | ἔτι δὴ U M Sch; ἔτι δὲ A Scl Hns. | ἀκλάστων U (et correxerat Scl); ἀβλάστων A Hns. | ἐν πολλοῖς: *syluestres arbores* G. | καὶ κατὰ μικρὰ Sch cum mrg-Vsc; καὶ τὰ σμικρὰ U (et μικρὰ A); καὶ τὰς μικρὰς Hns;—μικροὺς M; *sua germinandi initia minutioribus contineant surculis*: G. | γονίμους corr. Scl; μονίμους U M A Hns. | καὶ . . . κινήσεως Wmr; σ. δ. καὶ κιν. U Sch; δέεται μικρὰς κιν. A Hns.

2. ἐλάττον ἡ (in -των prima manu correct.) . . . καλλίω (ν super ω rec. manu script.) U. | δ' ἐκείνη Scl; δὲ ἐκείνη U A Hns.

3. αὐτὸ δὲ τοῦτ' U A Hns Wmr; ἀπὸ δὲ τούτου Ald-Bas Scl Sch-txt; *sed illud* G. | καρποὺς ὄντα πεπένει U (in κ. ου πεπαίνει rec. manu mutat.) | κατὰ μὲν γὰρ U M Sch; μὲν om. A Hns Wmr. | ἔχρῃν U (passim). | ὑπερίσχουσι corr. Sch; ὑπερίσχύουσι U A Scl; ὑπορίσχύουσι τῷ ἰσχύει Hns; *praevalent viribus* G. | καρπὸν ἴσχουσιν U A; κ. ἴσχυσιν Hns; *fructificant* G. | ἂν δὲ . . . κάκειων corr. Wmr; ἄμα δὲ . . . καὶ U A Hns Sch Hlg (p. 88). | ἂν . . . πέψις: *ergo magna geritur copia: cuius marurilitatem* (sic pro mat—) *uiris arborum attingere nequeant* G. | ἑτέρα δ' ὅτι U A Wmr; ἔτ. δὲ ὅτι Scl Hns Sch. | ἐνδόσει U A Scl;

so they are responsive to the seasons, and the more so because in most trees, which are free from injury and pruning, the vital principle is in these smallest parts, each one of which needs only a little excitation to germinate at once. And this occurs also in pears.³

Those uncultivated trees, moreover, germinate more rapidly than the cultivated for the same reason, namely that, since their vital principle is distributed through the smallest parts, they are more quickly influenced toward generation by their surroundings. Dryness also produces its effect; for, because of it, the moisture⁴ is diminished: what is smaller is more easily influenced. Therefore the process of germination and fruit-bearing in cultivated trees is more beautiful and more perfect, while that in the uncultivated is earlier.⁵

The question might also be raised as to why wild trees, being stronger than cultivated ones, do not bring their fruit to such perfection; for maturing ought to be in proportion to strength. One reason is the fact that they bear so copiously; for their strength is not so superabundant as is their immoderate quantity of fruit. If there be a great quantity of fruit in cultivated trees, ripening does not occur in them either,⁶ wherefore the husbandmen remove some of the fruits whenever they are too numerous. Another reason is the fact that the bodies of wild trees are denser and drier and attract more moisture to themselves, while the nourishing and ripening of fruit are effected by the proper distribution of moisture, which, when withdrawn to some other part of the tree, the fruit cannot get.

³ Greek *ἄπιος*, our *Pyrus sativa*. Gaza, however, specifically here translates by *sylvestris*. I take the clause as a parenthesis at least (it may well be an interpolated gloss) and refer the pronoun following to the trees mentioned earlier in sect. 1. See H. 2. 2. 12; Bod. Stap. on H. 4. 4. 2. (ed. 1644, p. 342. 2) believes *ἄχρᾱς* equated with *ἄπιος* there as well as in C. 1. 18. 2, for *ἄπιος*, says he, is spineless.

⁴ Sap.

⁵ H. 1. 4. 1; H. 3. 8. 1; C. 1. 18. 3; C. 2. 12. 6.

⁶ Hindenlang (p. 88) would keep the MSS reading and translate: "*die Menge der Früchte bringt Unreife mit sich.*"

(4) ἀπλῶς δ' οὐ τὰ ἰσχυρότερα καὶ τροφιμώτερα καθάπερ οὐδ' ἐπὶ τῶν ζώων, ἀλλ' ἑτέρα τις καθ' ἑαυτὴν πρὸς καρπογονίαν ἰσχύς καὶ δύναμις. μανὸν γὰρ καὶ εὐδίοδον καὶ ὑγρὸν εἶναι δεῖ τὸ καρποτοκῆσον, ἡ δὲ πυκνότης ἐναντίον ὥσπερ καὶ ἐπὶ τῶν γυναικῶν καὶ ἐπὶ τῶν ἄλλων ζώων. δ καὶ ἡ γεωργία βούλεται ποιεῖν ἀφαιροῦσά τε τὰ περιττὰ καὶ τροφήν παρέχουσα καὶ εὖειλα καὶ εὖπνοα ποιούσα. προφαίνει μὲν οὖν πλείω καρπὸν διὰ τὸ πρότερον εἰρημένον, τοῦτον δὲ οὐκ ἐκπέττει διὰ ταύτας τὰς αἰτίας.

XVI. Ἡ δὲ πέψις ἐστὶν ἐν τῷ περικαρπίῳ· τοῦτο δὲ δεῖ γίνεσθαι καὶ λαβεῖν χυλὸν ἀρμόττοντα πρὸς τὴν ἡμετέραν φύσιν. ἴσως δὲ αὐτὸ τοῦτο πρότερον εὖ ἔχει διελεῖν ὅτι πέψις ἐστὶν ἡ μὲν οὖν τῶν περικαρπίων, ἡ δ' αὐτῶν τῶν καρπῶν. καὶ ἡ μὲν πρὸς τὰς ἡμέτερας τροφάς, ἡ δὲ πρὸς γέννησιν καὶ διαμονὴν τῶν δένδρων· οἱ γὰρ καρποὶ καὶ τὰ σπέρματα τούτων χάριν. ἑκάτερα δὲ πῶς ἐναντιοῦται πρὸς τὴν ἑτέραν. ἅμα γὰρ τὸ περικάρπιον ὑγρότερον καὶ πλείον καὶ ὁ καρπὸς ἐλάττων καὶ ἅμα μείζων οὗτος καὶ τὸ περικάρπιον ἑλαττον καὶ σκληρότερον καὶ δυσχυλότερον.

ἐν δόσει Hns; ἐν ἀναδόσει fortasse legendum, quod habet Sch-ann; *non nisi humoris expansione perfici potest* G. | ἀντισπωμένην corr. Hns; ἀντισπωμένην U (primo σ eraso); ἂν τις σπωμένην M A Scl. | λαμβάνειν U A; λαμβάνη Scl; λαμβάνοι Hns; *quodsi humor aliunde trahitur: numquam ab alio capi facile possit.* G.

4. Post τροφιμώτερα <ταῦτα καὶ καρπιμώτερά ἐστι> add. Sch (e G: *haec amplius ad fructificandum valent.*); ταῦτα . . . ἐστι om. Wmr. | μανὸν U (et correxerat Scl e G: *solutum*); μόνον A Hns. | τε τὰ περιττὰ A (et περαττὰ Hns per mend.); τὰ τε περιττὰ U M. | εὖειλα conj. Wmr; εὖηλα Sch; εὐδηλα U A Hns; εὐδίοδα conj. Scl et hab. mrg-Vsc; *omnia patefacit: afflatibusque exponit.* G. | προφαίνη . . . τοῦτο δὲ M (sic ap. Sch).

1. Ἡ πέψις Sch, omisso δὲ. | ἐν τῷ περικαρπίῳ: *in pulpa fructus* G. | ἡμετέραν U M A Scl; ἡμέρον Hns; *nostrae naturae* G. | εὖ ἔχειν M. | δ τι U (et corr. Scl); ὅτι M A Hns; *coctionem . . . esse* G. | οὖν τῶν U M A; αὐτῶν Hns. | περικαρπίων (rec. manu in —πίων corr.) U. | τῶν καρπῶν: *seminum* G. | χάριν: post hanc vocem, *natura produxit* add. G in vers. | πρὸς τὴν / / / ἑτέραν (tribus litteris erasis) U. | περικαρπίον ὑγρότ. Scl mrg-Vsc; ἐπικαρπίον U A Hns. | πλείον Scl (e G) M; πλειω (—ειον rec. man.) U; πλείστον A Hns; *plenior* G. | οὕτως καὶ (in οὗτος κ. eras.) . . . δυσχυλότερον U.

In brief, it is not the stronger individuals among trees, any more than among animals, that are the better nourished; but the power and capacity to bear fruit is a thing peculiar to itself. For a tree that is to bear fruit must be porous, easily permeable, and moist, whereas compactness is opposed to productiveness, just as it is in women and other animals. And this is the effort of good husbandry: on the one hand to remove the superfluous, while on the other to supply food and render the trees easily accessible to sun and air. Wild trees, then, as was shown above, grow more fruit; but for the reasons given they fail to ripen it.

XVI

Now ripening takes place in the *perikarphion*.¹ It is not only necessary that this occur for the tree's perfection but that the tree acquire fruit juices suited to our nature.² Perhaps it would be well to make a distinction and say that the ripening of the *perikarphion* is one thing while the ripening of the *karpos*³ is another, the former being for man's food, the latter for the tree's reproduction and perfection; for *karpos* and seeds are for the latter purpose. Now each of these two purposes is, in a sense, opposed to the other; for when the *perikarphion* is moister and larger the *karpos* is smaller, whereas if the latter is the larger then the *perikarphion* is smaller and harder and less succulent.

¹ In this chapter I have transliterated the terms *perikarphion* and *karpos*. *Perikarpia* are defined by Schneider (vol. 4, p. 70) as "the pulpy fruits of domestic trees which are grown for human use and food." On the general subject cf. H. 1. 11. 5; H. 1. 12. 1; H. 1. 13. 3; C. 1. 19. 1, 2; C. 1. 21. 1; C. 4. 1. 2; Arist. *de Anima* 2: 1 (412 b 2); Arist. *Meteor.* 4: 3 (380 a 11, 14, 28); Arist. *Prob.* 20: 3 (923 a 15) and 20: 25 (925 b 30).

² Viewed as first cause and final cause, with reference particularly to the anthropocentric view of the *kosmos*, as in Aristotle.

³ "*Karpos* and *sperma*," says Scaliger (63. 2. B), "are one and the same, but from a different point of view. *Sperma* is the term used with reference to planting for a future plant, *karpos* when the reference is to our employment; thus wheat is both." (Cf. Schneider, vol. 4, p. 70, who adds: "Probably *karpos* is used of the fruit of trees, especially when pulpy and succulent; *sperma* is used of plants and herbs, but especially of cereals.") Perhaps in this passage Th. has in mind the fact that much even of what we call the seed is really food (e. g. almonds, beans), and certainly the definition in H. 1. 2. 1 is inapplicable here. *Karpos* usually, and naturally, implies all that we mean in ordinary speech by fruit; but in our present passage there is manifestly a technical use, the word representing that part of the fruit that is within the *perikarphion*.

(2) πρὸς δὲ καὶ ἡ γεωργία μεμηχάνηται κωλύουσα τὴν τούτων αὔξησιν καὶ τροφήν. ἅπαν γὰρ ὡς εἶπεῖν καὶ ἡμερον ἀγρίου καὶ γεωργοῦμενον ἀγεωργήτου καὶ κάλλιον εἰργασμένον τοῦ χείρον μικροπυρηνότερον ἀνγραινόμενον τε μᾶλλον καὶ τὴν τροφήν περισπῶν εἰς τὸ περικάρπιον, ἔτι δὲ τοὺς χυλοὺς ἐκπεπαῖνον εἰς συμμετρίαν τῆς ἡμετέρας χρείας. αἱ μὲν οὖν πέψεις τοσοῦτον διεσπᾶσιν εἴπερ χρὴ καὶ τὴν μὴ εἰωθυῖαν πέψιν λέγειν.

(3) τάχα δ' ἂν τις ἀπορήσειεν ἐκεῖνο καὶ ἀξιώσειεν δὲ τὰ ἰσχυρότερα κατακρατεῖ τοῦτο καὶ τὰ ἀσθενέστερα κατακρατεῖν. τὸ δὲ σπέρμα πάντων ἰσχυρότατον, κοινὸν γὰρ τέλος πάντων τῶν φυτῶν ἐστὶν ἐπείπερ ἡ τοῦ ὁμοίου γένεσις τέλος. ἅμα δὲ καὶ ἐν τοῖς ζώοις δοκεῖ τελειομένης ἐπιγίνεσθαι τῆς φύσεως, ὅταν δὲ ἐλλείπη διὰ τὴν ἡλικίαν ἢ παρακμάσῃ διὰ τὸ γῆρας ἐξαδυνατεῖ τὸ γεννᾶν. (4) οὐκ ἀλόγως δ' ἂν οὔτε ἀπορήσειεν οὔτε ἀξιώσειεν ἐν τελειότητι μὲν γὰρ τινὶ τὸ σπερμοφυεῖν καὶ τῶν ζώων ὅσων ἡλικίαν λάβοι τις ἄν. οὐ μὴν γε οὐδὲ τὰ ἰσχυρότατα σπερματικώτατα ἀλλὰ σχεδὸν ἐναντίως ἐκατέρωθεν μεριζομένης τῆς τροφῆς καὶ δυνάμεως· δὲ καὶ ἐπὶ τῶν φυτῶν συμβαίνει κατὰ λόγον συμβαῖνον. οὕτω δὲ δεῖ τὴν ἀναλογίαν λαμβάνειν ὡς <εἰς> ὁπότερον ἂν τούτων ὁρμήσῃ θάτερον ἐλλιπέστερον ἔσται· διαρκεῖν γὰρ οὐ δύναται πρὸς ἄμφω· τοῦτο γὰρ σχεδὸν ἐν ἅπασιν ὁμολογούμενον.

2. τοῦ χείρον corr. Sch (cum G: *et melius cultum quam deterius*); τοῦ χείρονος U A Hns. | μικροπυρηνότερον corr. Scl; μικροπρηνότερον A (-ωτερον in -ot. eras.) U. | ἀνγραινόμενον Sch; ἀν ὕγραιν. U A Scl Hns. | ἐκπαῖνον (πε super x rec. man. adscriptum) U. | εἴπερ χρὴ U A Scl Hns Sch; εἴπερ δεῖ Wmr; *conueniat* G.

3. τὸ ἰσχυρότερον (τὰ ἰσχ'α correct.) . . . ἰσχυρώτατον (-ρότ-eras.) U. | τελειομένης U A Scl Hns Sch; μένοισ M; τελειομένης Wmr. | παρακμάσῃ corr. Sch cum mrg-Vsc; -μασιν U A Scl Hns. | ἐλλείπη . . . γεννᾶν: *ob senilem aetatem defecerit: generatio cessat.* G.

4. οὐκ ἀλόγως . . . λάβοι τις ἄν. *inter praecedentia et post ὁμοίου γένεσις inserenda cens.* Sch-ann. | καὶ τῶν ζώων . . . τις ἄν: *quo tandem modo aetas in singulis accipi generibus possit.* G. | ὅσων conj. Wmr; ὡς ἂν U A Scl Hns Sch. | ἐκατέρωθεν U; ἐτέρωθεν A Scl Hns Sch-txt; *in alterutram partem* G. | ἡλικίαι U. | οὐδὲ τὰ Sch cum mrg-Vsc; οὔτε τὰ U A Hns. | ἰσχυρότατα U Sch-txt; ἰσχυρώτ. Hns Wmr; ἰχυρώτ. A. | συμβαίνει Sch cum mrg-Vsc; σημαίνει U A Scl Hns; *in genere quoque plantarum idem euenire ratio est.* G. | οὕτω δὲ δεῖ Wmr; οὐ. δὲ καὶ U A Hns Sch. | ὡς <εἰς> ὁπότ. Sch cum G et mrg-Vsc; ὡς

Husbandry moreover, with this fact in view, has devised methods of checking the growth and nutrition of the *karpōs*. For nearly every domestic tree has a smaller *karpōs* than has the wild tree, the cultivated tree a smaller than the uncultivated, the better cared for a smaller than the more ill cared for, because, in each case, the former receives more water and draws the nourishment away to the *perikarpion* and furthermore elaborates the fruit juice in a way to suit man's needs. The two kinds of ripening then are thus distinguished—if indeed we may use the term ripening⁴ in this unusual sense.

Perhaps someone will question this and will consider that, if any force is superior to the stronger members of anything, it must certainly be so to the weaker. Now seed is the most potent of all things, being the common goal of all plants, namely the production of their kind. Similarly also in animals, seed appears to come into being only when they have reached the perfection of their growth; but when in youth this perfection is not yet attained to, or when in old age it is past its prime, the ability to reproduce is found wanting.

The question and opinion we have just referred to are not irrational; for seed production among animals also is found in the perfection of their growth—that is, among as many of them as might prove to be of the proper age. However it is not at all those with the strongest bodies that are most productive of seed; but almost the contrary is the case, since the food and strength of the individual are shared between development and reproduction, exactly as happens logically also in plants. And we should take as an analogy the fact that whichever of these functions, growth or reproduction, gets the initial impetus, the other will be deficient; for the food supply cannot suffice completely for both. That this is practically a universal experience is an admitted fact.

⁴"πέψις." Ripening of the *perikarpion* is regularly called *πέπαισις*; cf. Arist. *Meteor.* 4:3 (380 a 11, 28).

(5) ἐν δὲ τοῖς φυτοῖς τρεῖς τινές εἰσιν οἱ μερισμοί, πρὸς αὐτὸ τὸ δένδρον καὶ τὴν βλάστησιν ὅπερ ἐναντίον τοῖς καρποῖς ἐὰν πλείον γένηται τοῦ ξυμμέτρου, διὰ τοῦτο γὰρ ἀκαρπία· καὶ πάλιν ἐν αὐτοῖς καὶ τοῖς περικαρπίοις· ἡ γὰρ εἰς τὸ ἕτερον ὁρμὴ κωλύει τὴν ἑτέραν. ὥσπερ οὖν ἐπ' ἐκείνων οὐκ ἄλογον οὐδ' ἐπὶ τούτων, ἀλλ' ἔχει τὸ ἀνάλογον· τὰ γὰρ ἄγρια καὶ εἰς τὸν καρπὸν καὶ εἰς ἑαυτὰ τὴν ὑγρότητα ἄγοντα παραιρεῖται τῶν περικαρπίων ὥστε μείζω γίνεσθαι τὸν καρπὸν.

(6) τάχα δ' οὐδ' ἂν που δόξειεν ὅλως ἄτοπον εἶναι τὸ μᾶλλον ἐφικνεῖσθαι τὰ ἄγρια τῶν σπερμάτων ὥσπερ ἄρρενα ὄντα πυκνότερά τε καὶ ξηρότερα τὴν φύσιν· διαθελύνουσι γὰρ αἱ κατεργασίαι καὶ αἱ τροφαί· τοῦτο μὲν οὖν ὡς καθ' ὁμοιότητά τινα λεγέσθω πορρωτέρω κείμενον· τῶν δὲ πεπάνσεων εἰς μὲν τὴν γένεσιν αὕτη κυριωτέρα, πρὸς δὲ τὴν ἡμετέραν χρεῖαν ἡ τῶν περικαρπίων. ἐν ποτέρᾳ δὲ δεῖ θέσθαι τὸ τελειότερον ἄλλος λόγος· ἐπεὶ οὕτω γε καὶ ὦν τοῖς φύλλοις μόνον χρώμεθα καὶ ὦν ταῖς ῥίζαις ὥσπερ τῶν λαχάνων αὕτη κυριωτέρα πέψις ἔσται. καίτοι γε τούτων τὸ τέλος ἐν τοῖς σπέρμασιν οἷς ἡμεῖς οὐδὲν χρώμεθα πρὸς τὴν τροφήν.

εἰ πότερον (εἰ in ὁ eras.) U; ὡς ὁπότ. A Hns; *ad utram enim partem* G. | <τοῦτο μὲν ἰσχυρότερον> ὁρμήσῃ θάτερον δ' Sch-txt solus. | ἐλλιπέστερον corr. Sch; ἐλλιπέστ. U A Hns. | ὁμολοῦμενον (nescio quae notae per ου factae) U.

5. ἐὰν πλείον A; ὅταν πλ. Scl; ἐὰν πλείων U. | αὐτοῖς Sch cum mrg-Vsc; ἑαυτῷ U M A; αὐτῇ Hns; καρπῷ maluit Scl (cum G: *ad fructum*) quod mihi placet (potius τῷ καρπῷ ut ap. Sch). | τὰ γάρ: τὰ δ' maluit Scl. | τὸν καρπὸν Sch cum Dlc et mrg-Vsc; τὴν τροφήν U A Scl Hns. | ἑαυτὰ τὴν Sch cum mrg-Vsc; αὐτὴν U A Scl Hns. | καὶ τὴν τροφήν post ὑγρότητα inseruit Sch-txt. | παραιρεῖται conj. Sch; παρὰ τὰ Scl; παρὰ τρία τε U A Hns; παρημέλησε Mld; *tum fructui tum pulvae humorem distribuunt: sed plus ad fructum deducunt: ita ut is effici possit amplior.* G. | μίζω . . . καρπῶν (in-ον eras.) U.

6. που Sch-ann; ποι U A Scl Hns. | ἄρρενα U M Sch cum mrg-Vsc; om. A Scl Hns; *masculae* G, de quo Scl commentatur: "de suo quia mox διαθελύνουσι." (!) | γένεσιν U. | δεῖ θέσθαι Sch (ex Hns: καὶ ὦν . . . δεῖ θέσθαι, quae verba sine dubio, per mendum operarum, loco permutata sunt); δεῖσθαι U M A Scl; (καὶ ὦν Hns). | καὶ ὦν τοῖς Sch; καὶ ἐν τ. U M A G; καὶ ὦν ἐν τ. voluit Hns (habet: δεῖ θέσθαι ἐν τ). *Vera perfectior sit alterius interest disputationis indagare. Nam et in foliis et in radicibus sic tantummodo uti solemus: ut olerum ea ipsa excoctio perfectior est.* G. | τούτων τὸ Sch (e G: *eorum finis*) cum Mld et mrg-Vsc; τοῦτο U A Hns.

There is a threefold distribution of sap in plants: first, to the plant itself for vegetation which, if it grows more than its proportionate share, is adverse to fruit bearing (for such overbalance is what makes sterile trees); second, to the fruit itself; and third, to the *perikarpion*. The stimulation of either of the last two hinders the development of the other.⁵ As, then, competition is logical between the vegetative and the reproductive parts, so also is it to be expected between the two elements of the reproductive parts.⁶ For example, wild trees, while they draw the moisture both to their *karpōs* and their vegetative parts, take it away from the *perikarpion*, so that the *karpōs* becomes larger.

Perhaps it would not be wholly unreasonable to hold that wild trees go more to seed because they are by nature male,⁷ as it were, and hence denser and drier; for cultivation and nourishment are effeminating influences. But this point, as apart from our subject, we would suggest simply by way of comparison. In the matter of ripening, the dominant⁸ interest with the plant is that of reproduction; but for our purpose the more important is the development of the *perikarpion*. In which of these, however, we are to find the more significant⁹ end is another question. Moreover, in the case of those plants of which we use the leaves alone, or of those whose roots we use, as for instance garden herbs, it is those parts whose maturing is of greater importance.¹⁰ Yet for these plants as well, the final purpose lies in the seeds, although we for our part make no use of them for our food.

⁵ Probably by his extremely condensed Greek Th. means: the stimulation of the first hinders growth in the second and third and vice versa, and also the stimulation of the second hinders the third, and that of the third the second.

⁶ *I. e.*, *karpōs* and *perikarpion*. Literally this sentence reads: "as then it is not illogical in the former ones, neither is it in the latter ones, but it has the analogous." This will give the uninitiated a sample of what the style of Th. can be.

⁷ Cf. H. 1. 14. 3-5; H. 3. 8. 1.

⁸ Cf. the beginning of the second sentence in section one of this chapter.

⁹ *I. e.*, which of the two comes nearer being a final cause. Wimmer takes the adjective to mean "more perfect"; it seems to me that Th. had in mind the philosophical sense of the word as it is so often used by Aristotle.

¹⁰ Cf. C. 6. 12. 6, 7, etc.

(7) ἔστι δέ τις καὶ οὗτος ὁ λόγος ὡς διὰ τὴν ψυχρότητα τῶν ἀγρίων οὐ δυναμένων πέττειν. τοὺς δὲ πυρήνας ἐκ τῆς ξυλῶδους καὶ περιττωματικῆς γίνεσθαι τροφῆς ὥσπερ τὰ <ὀστᾶ> ἐν τοῖς ζώοις· αὐτὸ μὲν τοῦτ' ἴσως οὐ κακῶς εἰ ὁ πυρὴν ἐκ τοῦ γεώδους καὶ ξυλῶδους, ἀλλὰ τὸ σπέρμα οὐκ ἔθ' ὁμοίως, ἀλλ' ἐκ τῆς καθαρωτάτης περιττώσεως. πέφυκε δὲ τὰ θερμὰ μάλιστα σπερμοφυεῖν ἢ θερμότερα ἂν εἴη. καίτοι γε τῆς τῶν ἡμέρων θερμότητος ἐκείνο φέρεται σημείον ἢ τῶν ὁπῶν δύναμις· ὁ μὲν γὰρ τῆς συκῆς τὸ γάλα πῆγνυσιν, ὁ δὲ τοῦ ἔρινεοῦ οὐ πῆγνυσιν ἢ κακῶς.

(8) πρὸς αὐτὸ δὲ τοῦτο πάλιν ἀντικεῖται τις ἑτέρα καθόλου πίστις ὑπὲρ τῆς θερμότητος, ὅτι τὰ ἄγρια μᾶλλον ἐν τοῖς ψυχροῖς δύνανται διαμένειν καὶ ὅλως δὲ διὰ θερμότητα ἢ ἰσχὺς. ἀλλ' ὑπὲρ μὲν τούτων τάχα ἂν ὕστερον εἴη λεκτέον. πλείων γὰρ ὁ λόγος καὶ ἔχων τινὰ ἀπορίαν, ποῖα θερμὰ καὶ ψυχρὰ καὶ ποίοις διοριστέον καὶ προσέτι τὸ ποῖον τὸ αἷτιον εἴτε μόνον εἴτε μεθ' ἑτέρων.

(9) καὶ χυλῶν δὲ ἡ πέψις δόξειεν ἂν ἔχειν διαίρεσιν καὶ ἀπλῶς καὶ πρὸς ἡμᾶς οἶον ὅσα ταῖς δριμύτησι καὶ ὅσα τοῖς φαρμακώδεσι καὶ ὁπώδεσι χυλοῖς, ἃ δὴ καὶ ἐπαινοῦσι καὶ μάλιστα χρῶνται τοῖς τοιούτοις. ταῦτα μὲν οὖν ὥσπερ ἰδιότης τις φύσεως πρὸς ἣν δῆλον ὅτι καὶ αἱ τροφαὶ καὶ αἱ κατεργασίαι τείνουσιν ἢ τούναντίον αἱ ἀγρίαι καθάπερ τῷ σιλφίῳ καὶ τῇ καππάρει καὶ εἴ τι ἄλλο φεύγει τὴν ἐργασίαν, ἢ εἴ τι πάλιν αὐτὴ διώκει τὴν ξηρὰν καὶ ὑγρὰν καὶ χειμερινήν.

7. τις * ὁ λόγος (*καὶ οὗτος prim. man. in marg.) U. | διὰ τὴν ψυχ. A Hns; τὴν om. U M. | περιττωματικῆς (mend.) Hns. | τὰ <ὀστᾶ> ἐν Wmr; τὰ ἐν U A; τὰ ἐν τοῖς ζώοις <ὀστᾶ> Hns Sch; ossa G et Scl in comm. | ἐκ τῆς καθαρωτάτης corr. Wmr; ἐκ τῆς ὕλης <τῆς καθαρωτάτης> Hns Sch; ἐκ γῆς καθαρ. U M A Scl; ex purissima . . . materia G. | περιττώσεως conj. Wmr; ὅπερ ἐν τούτῳ U; ὥσπερ ἐν τούτῳ M A; ἐν τούτῳ Hns Sch. | ἢ θερμότερα corr. Scl; εἰ θ. U A Hns; quo plus caliditatis obtineant G. | καίτοι γε Wmr; καὶ τό γε U A Scl Hns Sch; γε om. M; τῆς om. Scl. | δυναμεις U (in —μεις eras.).

8. διαθερμότητα A. | πλείων . . . ἀπορίαν: prolixiora namque opus est disputatione et quaeratur G. | ποίοις Wmr; τοῖς ποίοις U A Hns Sch. | προσέτι τὸ ποῖον τὸ αἷτ. Wmr; προσ. τῶν ποίων <τὸ ποῖον> τὸ αἷτ. A Hns et, τὸ ποῖον omisso, U; προσ. ποῖον αὐτῶν τὸ αἷτ. conjicio; atque etiam quaenam eorum causa sit G.

9. χυλῶν Wmr (partim e conj. Sch-ann: καὶ τινων δὲ ἐν τοῖς χυλοῖς ἢ πέψις); τινων U A Scl Hns Sch-txt; quorumnam G. | πέψις U (et correxerat Scl); σήψις A; ratio coquendi G. | καὶ ὁπώδεσι conj. Wmr; κ. σκώδεσι U; om. G A Hns Sch. | χυλοῖς ἃ U A Hns Wmr; χυλοῖς <διαφέρει> ἃ Sch-txt (cum G: different). | ἃ . . . ἐπαινοῦσι: quae quidem medica et commendantur G. | τῆς φύσεως M. |

There is also an explanation to this effect—that wild trees, because of their coldness, cannot ripen their fruit, and that the fruit stones are formed from the woody and residuous parts of the plant's food, as are the bones in animals. And this point of view is perhaps not ill taken if the stone consists of earthy and woody matter. The seed is of no such stuff, for it is formed out of the purest secretion.¹¹ Those trees that are naturally warm, however, incline to produce more seed the warmer they become; and yet what is considered, at least in domestic trees, the indication of their warmth is the power of their juices. For the juice of the fig will coagulate milk, while that of the wild fig will not, or will do it poorly.

In contrast with this point of view there is another—the general belief about heat: that wild plants can better endure cold¹² and that their strength consists entirely in their warmth. But about these matters perhaps we ought to say more hereafter; for the discussion would be rather lengthy and would involve some degree of uncertainty as to the nature of heat and cold, their differences, the causes of each, and whether they be simple or involved with others.

The elaboration of the fruit juices¹³ might also seem to be of two sorts, the one that is simply for the plant itself, and the one that is for us; instances of the latter being such as are sharp, drug-like,¹⁴ and acidulous,¹⁵ all of which are highly esteemed and much employed. These trees have then a native peculiarity toward the development of which both their food and their cultivation evidently contribute, or neglect, on the other hand, may contribute, as in silphium and caper and any other plant that dislikes cultivation,¹⁶ or that has an extreme fondness for dry or wet or wintry conditions of growth.

¹¹ C. 2. 10. 1.

¹² C. 2. 3. 6; C. 1. 21. 5.

¹³ H. 1. 12. 3.

¹⁴ C. 6. Chap. 13; H. 7. 9. 5.

¹⁵ L. and S. s. v. have "like fig juice, fit for curdling milk; Arist. P. A. 3. 15. 2; Theoph. H. P. 1. 12. 2." Hort, l. c., translates "milky." Does the adjective mean milky in appearance? Does it not rather mean curdling, sour, rennet-like?

¹⁶ H. 1. 3. 6; H. 3. 2. 1-5.

(10) αὐτοῦ δὲ τούτου τάχ' ἂν τις πάλιν ἀπορήσειε κοινήν τινα ἀπορίαν καὶ καθόλου πότερα τὴν φύσιν ἐκ τῶν αὐτομάτων μᾶλλον θεωρητέον ἢ ἐκ τῶν κατὰ τὰς ἐργασίας καὶ ἐν ποτέροις τὸ κατὰ φύσιν. σχεδὸν δὲ τούτῳ ταυτό, μᾶλλον δὲ μέρος τούτου [καὶ] πότερον ἐκ τῶν ἀγρίων ἢ ἐκ τῶν ἡμέρων. ἡ μὲν γὰρ φύσις ἐν αὐτῇ τὰς ἀρχὰς ἔχει καὶ λέγομεν τὸ <μὲν> κατὰ φύσιν, τὸ ἐκ τῶν αὐτομάτων τοιοῦτον, τὸ δ' ἔξωθεν ἄλλως τε καὶ <τὸ> κατὰ τέχνην· ἀφ' ἑτέρας γὰρ ἀρχῆς.

(11) οὐδ' ἐν τοῖς ζώοις ὅσα πλάττεται ἢ καταναγκάζεται πρὸς μικρότητα καὶ μέγεθος καὶ τιν' ἄλλον τύπον τῆς μορφῆς οὐ θετέα ταῦτα κατὰ φύσιν. ἡ δ' αἰεὶ πρὸς τὸ βέλτιστον ὁρμῇ καὶ τοῦθ' ὥσπερ ὁμολογούμενόν ἐστιν, ταύτῃ δὲ καὶ τὰ τῆς θεραπείας· ἅμα γὰρ καὶ τελείωσις γίνεται τῆς φύσεως ὅταν ὦν ἐλλιπὴς τυγχάνῃ ταῦτα προσλάβῃ διὰ τέχνης οἶον τροφῆς τε ποιότητα καὶ ἀφθονίαν καὶ τῶν ἐμποδιζόντων καὶ τῶν κωλύοντων ἀφαίρεσιν· ἃ παρέχουσι δῆλον ὅτι καὶ οἱ οἰκεῖοι τόποι πρὸς ἕκαστον, ἐν οἷς δὴ φαμεν δεῖν θεωρεῖν τὰς φύσεις αὐτῶν.

ἀγρίαι Hns Wmr; ἀργίαι U A Scl Sch; *neglectus saevitatesque* G. | σηφίωι (in σιλφ. eras.) . . . εἴ τι αλλω τί φ. U. | ἡ εἴ τι U M; καὶ εἴ τι A Scl Hns; *aut e diuerso siquid* G.

10. αὐτοῦ δὲ Wmr; ἐξ αὐτοῦ δὲ A Scl Hns Sch; *ex hoc . . . queret quispiam . . . cespitans ambiguitate* etc. G. | πότερα τὴν U (et corr. Sch e M); *ποτέως τὴν* A Scl Hns. | ποτέροις U; ὁποτέροις A Hns Sch-txt; *et utri generi ratio nostrae (naturae ap. Hns) tribui debeat: quod idem fere est.* G. | τοῦτωι ταυτό (ν super —τό script.) U; τοῦτο ταυτό A Scl Hns Sch-txt. | τοῦτον καὶ U A Scl; καὶ om. Hns et susp. Scl; *questionis illius utrum* G; καὶ delendum censeo. | ἀγρίων ἢ ἐκ U A Scl Hns G; καὶ inter ἡ et ἐκ inserere voluit Sch (in cur-sec “cum Scl”) et habet Wmr. | αὐτῇ U Scl Hns; αὐτῇ A. | τὸ <μὲν> Wmr; μὲν om. U A Hns Sch. | φύσιν, τὸ ἐκ Hns Sch; φ., τὸ δ' ἐκ U M A Wmr. | αὐτομάτων. Τοιοῦτον δ' οὐ τὸ ἔξωθεν Sch solus. | <τὸ> κατὰ τέχνην addo. | πότερον ἐκ . . . τέχνην: *Vtrum in genere syluestrum: an in urbano sit natura investiganda. Natura enim in se principia tenet: et id secundum naturam esse censemus: quod in se principium motus possidet et quietis: cuius generis illud profecto est quod sponte proueniat: non quod opera hominis praesertim cum arte quicquam constituit.* G.

11. τιν' ἄλλον conj. Wmr; τὸν ὅλον U (ν super τὸ script.) A Scl Hns Sch; *in totumque* G. | πρὸς τὸ βέλτιστον corr. Scl, cum G: *semper id spectat* (pro ὁρᾶ?) *quod optimum sit; πρὸς τε τὸ β.* U A Hns. | ταύτῃ U (et corr. Scl); ταύτῃ A

Concerning this very matter there might well arise the general question as to whether we should regard as the natural type¹⁷ those plants that grow of themselves or those that grow under cultivation, and in which of the two lies the development that is according to nature. This is the same as, or rather a part of, that other question: whether Nature is to be looked for in wild trees or domestic ones. For Nature has in herself the vital principles. We speak also of one thing as being natural which comes into being of itself, while we call something else artificial because it arises from some impulse outside itself.

In the animal world, too, such changes in size or any other characteristic of form as are wrought¹⁸ or forced¹⁹ upon the individual are certainly not to be called natural. For Nature, as all agree, is always striving for the best. Thus strive also all the operations of plant cultivation; for there is a perfecting of Nature whenever missing elements are supplied through Art, whether it be in the quality or abundance of food, or in the removal of obstructions and hindrances. Clearly these elements are supplied also by situations suitable to each plant, in which places, we say, one should expect to find their true natures.

¹⁷ From the anthropocentric viewpoint, as often.

¹⁸ *E. g.*, clipping a horse, dog, or what not—a transient effect.

¹⁹ *E. g.*, binding feet, chest, head, etc., so as to deform them permanently.

Hns. | καὶ τὰ τῆς Wmr; τὰ ἐκ τῆς U A Scl Hns Sch. | *θεραπείας βοηθεῖ* Hns Sch;
βοηθεῖ om. U M A Wmr. | ταύτη . . . *θεραπείας*: *Cultus uero et huiusmodi*
adhibita cura naturae auxiliatur. G. | ἅμα . . . φύσεως: *quae perfectius suum*
exequitur officium. G. | καὶ τελείωσις U M; καὶ om. A Scl Hns. | ὅταν ὦν conj.
Wmr; ὅταν οὖν U A Scl Hns Sch-txt; ὅσων οὖν Sch-ann; *dum igitur* G. |
ἐλλειπῆς M; ἐλλειπῆς U (in —λιπ— eras.) A Scl Hns. | *τυγχάνει* (in —η mutat.)
U. | προσλάβῃ U M; προσλαμβάνει A Hns Sch-txt. | *ποιότητα* U A Scl; *πίοτητα*
Hns (male cum G: *pinguedinem*). | καὶ τ. ἐμπ. καὶ τ. κωλυ.: *et rerum impedi-*
entium G (simplicius).

(12) ἀλλ' ἐκεῖνοι μὲν ἀπὸ τῶν ἔξωθεν μόνον παρέχουσιν οἶον ἀέρος καὶ πνεύματος καὶ ἐδάφους καὶ τροφῆς, ἡ δὲ γεωργία καὶ ἐν αὐτοῖς μετακινεῖ καὶ μετατίθησιν· ὥστ' εἶπερ καὶ ἐκεῖνά γε προσαπαιτεῖ πρὸς τὸ βέλτιον καὶ ταῦτα προσδέχονται ἂν ὡς ἂν οἰκεία· προσαπαιτεῖν δ' αὐτὴν καὶ ζητεῖν εὐλογον ἄλλως τε καὶ ἐκ τούτων ἡρτημένην καὶ ἐν τούτοις ἔχουσιν τὰς ἀρχάς· ἐπεὶ κακείνο τοῖς αὐτομάτοις ἄτοπον συμβαίνει καὶ ὥσπερ παρὰ φύσιν τὸ ἐκ τῶν σπερμάτων χεῖρω γίνεσθαι. καὶ ὅλως μὲν ἐξίστασθαι τοῦ γένους· οὐδὲ γὰρ δὴ τοῦτο κατὰ φύσιν, ἀλλ' αἰεὶ τὸ ὅμοιον ἀπογεννᾶν.

(13) αἱ μὲν οὖν ἀπορίαι σχεδὸν αὐταῖ τε καὶ τοιαῦται, φαίνεται δὲ καὶ ἐκ τῶν προτέρων εἶναι δῆλον ὅτι διαιρετέον τὰς φύσεις ὥσπερ καὶ τὰς πέψεις λέγομεν. τοῖς μὲν γὰρ ἡ αὐτόματος ἡ οἰκειότερα, τοῖς δὲ ἡ τῆς θεραπείας καὶ γεωργίας, ἕνια δ' ἀμφοτέρως. ἐξ ὧν καὶ διαιρετέον ὥσπερ καὶ ἡ φύσις διήρηται ἡμέροις καὶ ἀγρίοις ὁμοίως ἔν τε ζώοις καὶ φυτοῖς. ἐκατέροις γὰρ ἐστὶ πολλὰ φυσικὰ καὶ οἰκεία καὶ πρὸς σωτηρίαν καὶ πρὸς διαμονὴν καὶ πρὸς αὔξησιν καὶ βλάστησιν καὶ πρὸς τὴν τῶν καρπῶν γέννησιν. ἴσως δὲ καὶ ἐν αὐτοῖς τοῖς καρπίμοις πάλιν ἂν τις διέλοι τὰ μὲν εἰς τὸ αὐτόματον ἀφιεῖς, τὰ δὲ εἰς ἐπιμέλειαν καὶ κατεργασίαν μόνον. ἀλλὰ γὰρ τούτων μὲν ἐνταῦθ' ὁ διορισμός.

12. ἐκεῖνοι Sch cum G (*illa*, i. e. loca) et Vnr; ἐκεῖνο U A | Hns. <τὰ> νέ αὐτοῖς Sch-syl. | μετατιθεασιν (in -θησ- corr.) U. | εἶπερ καὶ U; καὶ om. A Scl Hns Sch-txt. | ἐκεῖνά γε corr. Scl (cum G: *illa*) et hab. Hns; ἐκεῖνό γε U M A. | πρὸς τὸ βέλτιστον Sch-txt; (-βέλτιον autem in cur-sec). | ὡς ἂν οἰκεία U A Scl Hns Sch-txt; om. G; ὡς ἂν οἰκ. Wmr (male). | προσαπαιτεῖν Sch; -τεῖ U M Scl; -τῇ A. | δ' αὐτὴν Sch-txt; ἡ δ' αὐτ. U M A; τὸ δ' αὐτ. Scl. | καὶ ταῦτα . . . εὐλογον: *haec quoque desyderent ratio est* G; καὶ ταῦτα προσαπαιτεῖν καὶ προσδέχεσθαι αὐτὴν ὡς ἂν οἰκεία εὐλογον conj. Sch-cur sec. | προσαπ. . . αὐτὴν: *τοιαύτην τόπων φύσιν* Hns. | γίνεσθαι U M; γενέσθαι A Hns. | ὅλως μὲν U M; ὅλως μὴ A; ὅλως Scl Hns Sch-txt et negationem om. G. | αἰεὶ corr. Hns (cum G: *semper*); εἰς U M A Scl.

13. ἐκ τῶν conj. Wmr; ἐκ τούτων U A Scl Hns Sch. | πρότερον post *ἔστι* Sch solus (e G). | αὐτόματος ἡ οἰκ. U M; αὐτ. ἐστὶν οἰκ. A Hns Sch-txt. | θεραπεία κ. γεωργία Sch-txt (et in syl. ut var. lect.). | διαιρετέον corr. Sch; θεωρητέον U A Hns; *consyderandum* G. | ἐν τε U; ἐν τοῖς A Hns Sch-txt. | πολλὰ conj Wmr; φύλλα U M A; στοιχεῖα conj. Scl; αἰτία Hns Sch; *frondes aptissimas*

But the situation provides only the externals such as climatic conditions, winds, soil, and nourishment; while husbandry stimulates and transforms elements within the plant itself, so that, if Nature requires these for her best development, she will adopt them as though they were her own. That she should require these elements and seek them is logical, especially since she depends upon them and in them finds her vital principles. Moreover, in plants that grow of their own accord, it is an anomalous occurrence and one, as it were, contrary to Nature, that they grow worse from their seeds and, in general, degenerate.²⁰ For this, too, is not according to Nature; we should rather expect like always to produce like.

These then and others like them are the vexed questions on this matter; and it would appear certain, from what has been said, that we should make a distinction in plant natures just as we did in ways of ripening. To some plants unaided growth is better suited, to others growth under care and cultivation, to still others some of both methods, from which it follows that there should be a distinction made, as Nature differentiates, between tame and wild kinds in both plants and animals alike. For both kinds of plants, wild as well as domestic, have many natural and peculiar qualities suited to their preservation and endurance as well as for growth and germination and generation of fruit. Perhaps even in fruit trees themselves one ought to make a distinction between those that grow of themselves and those that grow only under care and cultivation. In fact it is just in this that the distinction among them is made.

²⁰ H. 2. 2. 4, ff.

G (qui φυσικά καὶ omisisse videtur). | καὶ βλάστησιν om. G. | καὶ πρὸς τὴν τῶν καρπῶν U A Hns Sch; πρὸς τὴν om. Wmr. | γένησιν U. | πάλιν ἄν τις A; ἄν om. U M. | ἐνταῦθα: hinc G (unde ἐντεῦθεν Sch-cur.sec). | δὲ εἰς lego cum U; δ' εἰς cett.

XVII. Περὶ δὲ τῆς πέψεως ὅθεν ὁ λόγος ἐξέβη πάλιν τὰ ἐπίλοιπα λεκτέον. ὥς γὰρ ἐπὶ τὸ πᾶν ὦν μὲν ὁ καρπὸς ὑγρὸς καὶ γυμνὸς ἢ λεπτὸν ἔχων περὶ αὐτὸν κέλυσος ταῦτα μὲν πρωϊκαρπα καθάπερ ἄμπελος καὶ συκῆ, μάλιστα δὲ συκάμινος· αὕτη γὰρ γυμνὸν ἔχει τὸν καρπὸν ὥσθ' ὅσον ἂν ὁ ἥλιος ἐπέλθῃ ταχὺ προηλλοίωσεν, βραχείας δεόμενον θερμότητος· ἅμα δὲ καὶ ἐν αὐτῷ συνεργάζεται δύναμις ἰσχυρὰ καὶ ἀθρόως ἐπιούσα καθάπερ καὶ πρὸς τὴν βλάστησιν. (2) ἢ γὰρ ὀψιότης ἐποίησεν ἀθροισμόν, ὅθεν αἶ τε βλαστήσεις ἀθροοὶ καὶ μετὰ φορᾶς γίνονται νεανικῆς ὥστε καὶ ψόφον ποιεῖν καθάπερ τινὲς φασι καὶ αἱ πέψεις ταχείαι· παρόμοιον γὰρ τὸ συμβαίνειν ὥσπερ καὶ τοῖς σίτοις ὑπὸ τῶν χειμῶνων κατεχομένοις· ἀνεθέντες γὰρ οὕτω ταχείας ποιοῦνται τὰς αὐξήσεις ὥστε μὴ πολὺ καθυστερεῖν ἢ μὴ κατὰ λόγον τοῖς εὐδιεινοῖς.

(3) ἢ μὲν οὖν τῆς συκαμίνου διὰ τοῦτο πρώϊος. ὥς δὲ Μενέστωρ φησὶν, ἢ μὲν βλάστησις αὐτῆς ὀψία διὰ τὴν ψυχρότητα τοῦ τόπου, ἢ δὲ πέψις ταχεία διὰ τὴν ἀσθeneian. οἱ δὲ τῆς ἀμπέλου καὶ τῆς συκῆς ὀψιαιτέροι, ὅτι καὶ τὰ κέλυσθαι περικείται καὶ ὑγρότης πλείων καὶ παχυτέρα. καὶ τὸ μὲν σύκον μείζον τῷ ὄγκῳ καὶ ἀθροωτέρα πως ἢ πέψις αὐτῶν, οἱ δὲ

1. ὥς γὰρ U; γὰρ om. G A Scl Hns Sch-txt. | καὶ γυμνὸς om. G. | περὶ αὐτὸν corr. Scl; π. αὐτὸν A Hns; π. αὐτὸ U M. | αὕτη γὰρ U M; αὕτη μὲν γὰρ A Hns. | ὅσων (in-on eras.) U. | ὅσον κ' ἂν M. | ἐπέλθῃ conj. Wmr; ἐπιθῇ U M A Hns Scl; ἐπίδῃ Sch-txt; ἐπιθίγῃ conj. Sch-ann; *tepefecerit* G (unde ἐπιθήρῃ conj. Coray ap. Sch.) | τάχῃ . . . θερμότητος: *citissime fructus imitari possit: utpote quae minimo eget calore*. G. | δεόμενον U M (et conj. Scl e G); δεόμενος A Hns. | καὶ ἐν αὐτῷ U A Scl Hns; κ. ε. αὐτῇ conj. Sch; om. G.

2. ὀψιότης et βλαστήσεις (in-σεις correct.) U. | ἀθροοὶ U A Scl Hns Sch; ἀθρόαι Wmr. | αἱ πέψεις U M; αἱ om. A Hns (Sch: "om. U", sed falsum). | ταχείαι corr. Sch; ταχείς U M A Hns. | χειμῶνων (in-μων-corr.) κατεχομένων (in-ους corr.) U. | οὕτω corr. Sch (cum G: *adeo*); eandem emendationem condemnat Scl; οὔτοι U A Scl Hns. | ἀνεθέντες U (et corr. Sch cum G: *laxata*); ἀναθέντες A Scl Hns. | ἢ μὴ corr. Sch; εἰ μὴ U A Scl Hns; ἢ μὴ . . . εὐδιεινοῖς om. G. | <τῶν ἐν> prae τοῖς εὐδ. add. Sch solus.

3. τὴν ψυχρότητα U M; τῆς ψυχρότητος A Hns; *propter frigiditatem* G. | πέψις (in-ψις eras.) U. | οἱ δὲ U; ἢ δὲ A Scl Hns Sch-txt; *fructus* G. | ὀψιαιτέροι (in-αιτ-eras.) U; ὀψιαιτέροι A Hns; -τέρα conj. Sch-txt. | πλείων καὶ U G A Hns; πλ. ἢ conj. Sch-txt. | ἀθροωτέρα A. | πῶς U A. | αὐτῶν U A Hns; αὐτοῦ conj. Sch-txt. | βοτρὺς (ε super v script.) U. | τὰ μὲν σύκα μείζω . . . αὐτῶν conjicio; τὸ μὲν σύκον μείζον . . . αὐτῶν vulg; *ficus mole ampliore consistant* G. |

XVII

We must now complete the discussion on the ripening of the fruit, a subject from which we digressed. In general, trees whose fruit is moist and either naked or covered with a light integument¹ ripen early, as vine and fig, but especially mulberry.² For this last has a naked fruit, so that whatever part the sun reaches changes quickly, and requires but little warmth. At the same time a powerful force, moving with a rush similar to that for germination, is developed within it.

For, owing to its lateness in germinating, this tree stores up an accumulation of energy; and the buds burst forth with such vigorous force that, as some maintain, they actually make a sound;³ then ripening follows rapidly. A similar phenomenon may be observed in those grains⁴ which are held back by the winter; for when they are finally released, they grow so rapidly that they mature nearly as soon as they might reasonably have done under continually favorable conditions.⁵

The mulberry therefore, for the reasons we have given, ripens early. But, as Menestor says, its germination is late because of its coldness of situation, while its ripening is rapid because of its "weakness."⁶ The fruits of vine and fig come later because they are surrounded by an integument and because their sap is thicker and more abundant. The fruit of the fig tree is also greater in bulk and ripens more nearly all at once. The bunches of grapes, on the other hand, are too numerous for the strength of the vine, and the fruit is packed together with no spaces

¹ H. 1. 11. 3; C. 4. 1. 2.

² *Morus nigra*; H. 1. 10.10; Plin. *N. H.* 15: 96 f. (27).

³ Plin. *N. H.* 16: 102 (41).

⁴ H. 8. 4. 6; H. 8. 6. 4; C. 3. 24. 3.

⁵ *I. e.*, had they had warm weather from their very planting.

⁶ Th. never tires of insisting upon the greater susceptibility and responsiveness of the weak. Cf. *e.g.*, C. 2. 1. 7; C. 4. 1. 3; C. 4. 8. 1, 2; C. 4. 10. 1; C. 4. 12. 6.

βότρυνες καὶ τῷ πλήθει πλείους ὥς πρὸς τὴν δύναμιν καὶ ἐν τούτοις ἄθρόος ὁ καρπὸς καὶ οὐ διειλημμένος, ἔτι δὲ ὑπόσκιος καὶ οὐχ ὁμοίως ὑπαίθριος καὶ ἡ ὑγρότης πολλή, φύσει γὰρ τὸ δένδρον φίλυδρόν ἐστιν. ἔτι δὲ καὶ ταύτῃ συμβαίνει τὸ μὴ ἄθρόον ἀλλὰ κατὰ μέρος πέττειν, διὸ καὶ πολὺν διαμένει χρόνον καὶ ἐπὶ πλείον δὴ τούτοις ἡ ὑγρότης λεπτή καὶ ὑδατώδης. ἅπαντα γὰρ τὰ γλυκέα βραχυτέρας ποιεῖ τὰς πεπάνσεις· ἐὰν δὲ δὴ τις καὶ πρὸς τὰς ἡμετέρας χρείας ποιῇ τὰς ἀφαιρέσεις ἔτι μᾶλλον.

(4) αὐτῶν μὲν οὖν τούτων σχεδὸν ἐν τούτοις αἱ αἰτίαι τοῦ πρότερον καὶ ὕστερον. οὐ μὴν καθ' ὅλων τῶν δένδρων ἐστὶ τὸ πρῶτον. πολλὰ γὰρ διαφοραὶ καὶ ἀμπέλων καὶ συκῶν ὥστ' ἐνίων πόρρω πάνυ πεπαίνεσθαι, διόπερ ἴσως τὰς καθ' ὅλου λεκτέον αἰτίας. πρωῒκαρπα μὲν ὅσα μῆτε κάθυγρα μῆτε ψυχρὰ τοῖς ὁποῖς, ἔτι δὲ γυμνὰ ἢ λεπτοῖς ὑμέσι περιεχόμενα καὶ τὴν πέψιν ἔχοντα τῶν χυλῶν ὑδαρῇ καὶ μὴ παχείαν. (5) ὀψίκαρπα δὲ τὰ ἐναντία τούτων ὅσα κάθυγρα καὶ ψυχρὰ καὶ τοῖς καρποῖς ἢ τοῖς περι-καρπίοις ξυλῶδη καὶ σκληρὰ καὶ ὧν αἱ περιοχαὶ τοιαῦται καὶ ἅμα πλείους, ἔτι δὲ ὧν οἱ χυλοὶ καὶ πρὸς τὰς πέψεις λιπαροὶ ἢ ἄλλην τινὰ ἔχοντες παρα-πλησίαν δύναμιν. [ἐὰν ξηροὶ τε καὶ ὀλίγην ἔχοντες ἅμα καὶ τοιαύτην ὑγρότητα πρὸς τὴν πέψιν.] ἅπαντα γὰρ ταῦτα κωλυτικὰ τῶν πέψεων.

ὥς πρὸς τὴν δύναμιν: *quam ut breui excoqui possunt*. G. | ἄθρόος A; ἄθρῶς U. | καὶ οὐχ ὁμ. ὑπαίθ.: *nec sub diuiales dependent* G. | τὸ δένδρον: *Vitis* G. | ἔτι (rasura super ι) . . . ἄθροον (in ἄθροον correct.) U. | ἔτι δὲ καὶ . . . πέττειν: *morus* add. G. | ἔτι δὲ καὶ . . . καὶ ὑδατώδης ad finem sectionis ex emendatione Linckii posuit Sch; *omnia haec verba post εὐδεινοῖς habent* U M G A Scl Hns. | ἐπὶ πλείον δὴ τούτοις: *nec . . . amittenda est* G. | βραχυτέρας U A; βραδυτέρας conj. Scl; *breuiori tempore* G. | λεπτῇ (in-τῇ eras.) U. | ἐὰν δὲ τις (omisso δὴ) Hns solus. | ποιεῖ (?) U (rasura est).

4. καθ' ὅλων U M; καθόλου A Scl Hns Sch Wmr; *non tamen cunctae arbores generis cuiusque praecoques sunt*. G. | καθόλου <τούτων> τῶν Sch solus. | πεπενεσθαι (secundo e eraso) U. | πεπαίνεσθαι <τὸν καρπὸν> Sch (e G: *fructus . . . maturescere*). | πρωῒκαρπα μὲν γὰρ Hns; πρ. μ. οὖν Sch; *ergo praecoques* G. | κάθυγρα corr. Scl; κάθυδρα U M A Hns. | καὶ post ψυχρὰ add. Hns solus. | τοῖς ὁποῖς om. Sch-txt solus; *quae . . . succo frigidae constant* G. | τοῖς καρποῖς post ἔτι δὲ Sch solus; *quaeque fructum nudum . . . gerunt*. G. | πέψιν U M A Scl Hns; φύσιν conj. Sch-txt. | ὑδαρῇ U. | παχείαν M; *cocturamque succorum . . . non crassam faciunt*. G.

5. τὰ ἐναντία U; τὰναντία A Hns Sch-txt. | ψυχρὰ καὶ τ. κ. Sch (e G: *frigidae et fructu*—); ψ. ἦ. τ. κ. U M; ψ. τ. κ. A Hns. | σκληρὰ U M; ξηρὰ A Scl Hns Sch-

between. Furthermore the fruit is rather shaded and not so well exposed to the air. There is also much moisture, for the vine is naturally fond of water. It happens, therefore, that the vine does not ripen all its fruit at once, but part by part, wherefore it is quite lasting and the juice stays longer thin and watery. More precisely, all sweet fruits mature quickly, and the more so if some fruit be plucked for our use.⁷

The reasons why some of the trees we have been discussing are earlier, some later in ripening, are to be found in general in the statements just given. Nevertheless all these trees are not early bearers; for there are many points of difference among various kinds of vines and fig trees so that some of them ripen considerably later, for which reason we ought probably to give the causes that are common for all. All trees are early bearers⁸ whose sap is neither too liquid nor cold, and whose fruit, moreover, is naked or covered with only a thin integument, and whose juices stay watery and do not thicken in ripening.

Late bearers constitute the opposite type, including those which are very moist and cold, and whose fruits or fruit cases are woody and hard, and whose envelopes are of the same sort with numerous layers. ⁹Their juices, furthermore, are fatty or have, on ripening, some other similar quality¹⁰ if the fruit is dry and has at the same time little of such moisture for ripening. For all these things hinder the ripening of the fruit.

⁷ Cf. a natural way of reducing the quantity of fruit, C. 1. 20. 5.

⁸ C. 1. 10. 7; C. 1. 21. 7; C. 2. 11. 7.

⁹⁻¹⁰ Schneider suspects as a gloss; the rest of the sentence Wimmer brackets.

txt; *praedurae* G. | ἡ ἄλλην corr. Sch-txt (<ῆ> καὶ ἄλλην Syll); καὶ ἄλλην U A Scl Hns. | καὶ ὦν . . . πλείους: *quibusque fructus lignoso saevo numerosoque continentur putamine* G. | πρὸς τὰς πέψεις om. G. | ἐὰν ξηροὶ U M A Hns; καὶ ὦν <οι | καρποὶ> ξηροὶ Sch-txt (e G). καὶ ὦν . . . ὑγρότητα glossema esse susp. Sch-ann. | ἅμα καὶ <λιπαρὰν ῆ> τοιαύτην Sch solus (e G). | ἐὰν ξηροὶ . . . πέψιν: *aut quibus fructus sicci parumque huiusmodi habentes: idque pingue uel eiusmodi aliquid*. G. | κωλυτικά: *uehementer impediunt* G (pro κωλυτικώτατα ?).

(6) ἐκ δὲ τῶν καθ' ἕκαστα θεωροῦσι σύμφωνος ὁ λόγος τῶν γινομένων. τῶν γὰρ ἀειφύλλων ἅπανθ' ὥς εἰπεῖν ὀψικάρπα. ξυλῶδεις δὲ οἱ καρποὶ καὶ τὰ περικάρπια καθάπερ πεύκης, πίτυος, κυπαρίττου, τῶν δ' αὖ ξηροὶ ἢ λιπαροὶ ἢ γλισχρότητά τινα ἔχοντες, ὥσπερ ὁ τῆς κέδρου καὶ τῆς ἱξίας, διὸ καὶ οὐκ ὄντες μεγάλοι δυσκατέργαστοι τῷ εἶναι τοιοῦτοι, καὶ ἅμα διὰ τὴν πυκνότητα μικρὰ καὶ ἡ ἐπιρροή καὶ ἡ ἐπίσπασις ὅλη.

(7) τῶν δὲ μὴ ἀειφύλλων ὅσα κάθυγρά τε καὶ ψυχρὰ καὶ ὅσα γεώδη· καὶ γὰρ ἡ ψυχρότης καὶ τὸ πλῆθος δυσέργαστον καὶ τὸ γεῶδες καὶ ἡ ξηρότης ὥσπερ τῶν ἀχράδων καὶ τῶν βαλάνων, ὅσα δὲ κέκραται πρὸς τούτοις καὶ ἐν θερμασίᾳ τυγχάνει καὶ μανὰ ταῦτα καὶ πρωῒβλαστῇ καὶ πρωῒταρπα συμμετρίαν ἔχοντα τῆς μίξεως καὶ ἐν αὐτοῖς καὶ πρὸς τὸ περιέχον.

(8) χρή δὲ λαμβάνειν ἕκαστα ὥσπερ τῶν εἰρημένων ἐὰν μὴ τις ἢ κώλυσις. οὐδὲ γὰρ ἐν τούτων κύριον ἐπενεγκεῖν οὔτε πρωῒκαρπῖαν οὔτε ὀψικάρπῖαν οὐδὲ γε πλείω <ἢ> πάντα, ἐὰν ἕτερ' ἅττα ἐναντιώτατα. λέγω δ' οἷον ἔνια γυμνόκαρπα μὲν, ὄψια δέ, καθάπερ μῖλαξ καὶ ἄλλ' ἅττα βοτρυνώδη. τὰ δὲ πρὸς τῷ ὀψίῳ καὶ κατὰ μέρος πεπαίνεται καθάπερ ὁ βάτος. τούτων

6. ἐκ δὲ . . . γινομένων: *quod in singulis etiam percipi licet* G. | ἕκαστα γινομένων θεωροῦσι σύμφωνος ὁ λόγος· τῶν γὰρ κτλ. Sch-txt; ἐπὶ δὲ τῶν καθ' ἕκ. θεωρ. σύμφ. ὁ λόγ. τοῖς γινομένοις conj. Sch-ann; τῶν γινομένων A Scl Hns (et γιν. U). | σύμφωνος U (et corr. Scl); συμφώνως M A. | δὲ οἱ καρποὶ U; δὲ καὶ οἱ κ. G A Scl; δὲ οἱ καὶ κ. Sch-txt; *tam fructus quam fructum ambientia* G. | καθάπερ πεύκης A; καθὰ πεύκης U M. | τῶν δ' αὖ conj. Wmr; τούτων δὲ U A Hns; ἄλλων δὲ M Sch. | ἢ λιπαροὶ om. Hns solus. | ἱξίας U (et correxerat Sch); ἱξύας A Hns Wmr; ὀξύας conj. Scl; om. G. (Vide Bois. s. v. ἱξος). | ἐπίσπασις corr. Hns (cum G: *accessus*); ἐπίστασις U M A Scl. | ἐπίσπασις ὀλίγη conj. Sch-cur. sec.

7. γεώδη: *sero maturant* add. G, deinde: *Frigiditas enim et siccitas et multitudo et terreua (sic) concretio confici et: maturescere quam difficilime possunt.* | πρὸς τούτοις U M A Scl Wmr; ἐν τ. Hns; εἰ τ. Sch-txt ("e G"). | <ἱκανῶς καὶ> prae ἐν θερμασίᾳ Hns; post ἐν θ. Sch-txt; om U M A Scl; *Quae autem media temperie constant: et satis calidae solutaeque sunt:* G; unde ὅσα δὲ κέκραται πως τούτοις καὶ εὖ θερμ' ὄντα τυγχάνει καὶ μανὰ, ταῦτα κτλ. conjicio. | αὐτοῖς corr. Scl; αὐτ. U A Hns Sch.

8. ὥσπερ post εἰρημένων Sch solus. | οὐδὲ γὰρ ἐν τούτων conj. Wmr; οὐδὲν γὰρ ἐν τούτῳ U A Scl Hns Sch; *nullus enim neque* G. | οὐδὲ γε U A Scl Hns; οὔτε γε Sch-txt; <ἢ> add. Wmr; πλείω πάντα, quod juxta sunt, jam condemnauerat Scl; οὐδὲ γε . . . πάντα om. G. | ἕτερ' U Sch-syl; ἕτερα A Scl Hns Sch-txt; om. G. | ἐναντιώτατα U A Scl; ἐναντιώματα Hns; ἐναντιῶται Sch. | μῖλαξ correxi (vid. Bois. pag. 885); μῖλαξ U (σ rec. man. superscripto) M Wmr;

But if any person will examine these particulars in each plant, he will find that our account agrees with the facts. For instance, practically all evergreens bear late,¹¹ and their fruits and the parts about them are woody, as in fir, Aleppo pine, and cypress,¹² and again others have dry or oily¹³ fruits, as prickly cedar and pine thistle;¹⁴ wherefore, though the fruits are not large, they find difficulty in maturing because of the qualities named. At the same time, because of their compactness, their flow of sap and their general intake of nourishment is slight.

Of trees that are not evergreen, those are later bearing which are very moist and cold and earthy; for cold and a great quantity of moisture interfere with elaboration as does an earthy quality and dryness, as for instance in wild pear¹⁵ and *balanos*¹⁶. Such trees, however, as have these qualities in balance and happen to have some warmth and openness of texture are early both in germinating and ripening, since they have a balanced mixture in regard both to themselves and to the surrounding conditions.

But each of the qualifications stated is to be taken with the understanding that there be no obstructing elements present. For no single one of these qualities is capable of bringing fruit to maturity, whether early or late, nor can several or all of them together accomplish it if there be some others that decidedly oppose them. We may cite as an example some of the naked fruited trees which are nevertheless late in bearing, such as *smilax*¹⁷ and others which, like it, have fruit in clusters. Others, in addition to being late bearers, also ripen their fruits one after another as does the bramble.¹⁸ Of these plants some are late

¹¹ H. 3. 4. 6.

¹² *Pinus pinea*; *Pinus halepensis*; *Cupressus sempervirens*.

¹³ Perhaps gummy; cf. H. 9. 1. 2.

¹⁴ *Juniperus oxycedrus* (cf. Th-D *ap.* Hort., II, p. 455); *Atractylis gummifera* (*op. c.*, p. 452).

¹⁵ H. 3. 4. 4.

¹⁶ H. 4. 2. 1, 6; see L. and S. *s.v.* and cf. H. 1. 12. 1; *Balanites aegyptiaca* Th-D *ap.* Hort, II, p. 443).

¹⁷ *Smilax aspera*; H. 3. 18. 11, 12.

¹⁸ *Rubus ulmifolius* (Th-D etc., p. 443); H. 3. 18. 12.

γὰρ τὰ μέν, ὅτι ψυχρὰ τῇ φύσει, ὀψικάρπα καὶ ὀψιβλαστῇ, ὅσα δὲ γυμνὰ καὶ ἀκέλυφα, οὐχ ἱκανὰ περιλαμβανόμενα τῇ ὥρᾳ· τὰ δέ, ὅτι ξηρὰ τῇ φύσει· πᾶν δὲ τὸ ξηρὸν ἱκμάδος δεῖται καὶ πρὸς τροφήν καὶ πρὸς πέψιν· (9) ὥς δὲ ὁ βλαστὸς ἀμφοτέρων μετέχει τῶν ὥρων ἐπὶ πολὺν χρόνον παρεκτείνων· ἀλλ' ὥστε τύπῳ εἰπεῖν ταύτας ὑποληπτέον εἶναι τὰς αἰτίας. ἐπεὶ καθ' ἡλικίαν ὀψικαρπότερα καὶ μὴ κατὰ τὰς ἐνιαυσίους ὥρας οἷον τὰ νέα τῶν φυτῶν διὰ πλήθους ὑγρότητος καὶ τὸ ὅλον τροφῆς ὀψικάρπα. τὰ δ' αὖ πάλιν ὥς ὀψίφορα πόρρω τῆς ἡλικίας ὄντα καθάπερ τὸ ἐν Αἰγύπτῳ λεγόμενον δένδρον ὃ ἑκατοστῷ ἔτει μυθολογοῦσι φέρειν καρπὸν. ἡ δ' αὖ συκάμινος οὐδὲ πέττειν δύναται δι' εὐτροφίαν καὶ πλήθος ὑγρότητος μὴ ἐπικνισθέντων καὶ ἐπαλειφθέντων ἐλαίῳ τῶν καρπῶν. οὐ μόνον δὲ τὸ πλήθος ὀψικαρπεῖν ποιεῖ τῆς τροφῆς, ἀλλὰ καὶ ἀκαρπεῖν ἔνια, καθάπερ ἐπὶ τε τῶν ἀμπέλων εἴρηται καὶ ἐπὶ τῶν ἀμυγδαλῶν καὶ ὅλως τῶν διαττραινομένων καὶ τοῖς παττάλοις κολαζομένων.

(10) ἅπαντα γὰρ ὅταν τοῦτο πάθωσι, τῆς ὑγρότητος ἀπελαθείσης, τὰ μὲν ἐξ ἀκάρπων κάρπιμα, τὰ δὲ καλλικαρπότερα καὶ ἐγχυλότερα γίνεται.

σμίλαξ A Hns Sch-txt; *smilax* G. | ὅτι ψυχρὰ U M G; ὅτι om. A Hns. | τῇ φύσει M G; τὰ τῇ φ. U A Hns; *quod quadam natura frigida sint* G. | περιλαμβανόμενα U Hns; μένων M A; ἐπιλ'μένων A-Bas Scl; περικαταλ'μένα Sch; *cum tempus occurrat incommodum*. G. | ἱκανὰ <ἐκπέττειν> περι. Sch-syl; (—<πέττειν τὸν καρπὸν> Sch-cur). | τὰ δὲ ὅτι Hns Sch; τὰ δ' ὅτι U A Wmr (sed vid. Hindenlang). | Post φύσει, *diu immatura persistunt* add. G.

9. ὥς om. Scl G; ὦν δὲ καὶ ἡ βλάστησις . . . παρεκτείνει conj. Sch-ann, et ὦν δὲ ἡ βλ. ὀψία, τούτων ὁ καρπ. ἀμφ. κτλ. Sch-cur; παρατείνοντα Scl. | ὥστε U A Hns Wmr; ὥς γε Scl Sch-txt; *quantum formula* G. | ὀψικαρπότερα <ἡ πρωϊκαρπότερα> καὶ mrg-Vsc | ὀψικ. . . ὥρας: *sero matureue fructus pro tempore perficiuntur* G. | ὥρας corr. Scl; χῶρας U M A. | ὀψίφορα Hns; ὅτι φορὰ U M A Scl (qui autem: “sed angit codex.”); *quod effoetas* G. | ἑκατοστῷ corr. Scl et Palm. *Exerc.* (cum G: *centesimo*); ἐκάστῳ U M A; ἐκτόστῳ Hns (sed *centesimo* in vers. lat.); ἐκαστόστῳ (mend.) Wmr. | συκάμινος: *ficus regionis eiusdem* (bene!) G,—i. e. συκ. ἡ Αἰγυπτία (*Ficus sycamorus*). | ὀψικαρπεῖν Hns; ὀψιοκαρπεῖν U M A. | διαττ. καὶ τοῖς πατ. κολ. conj. Wmr; διατ. κ. ταῖς πληγαῖς τιττραινομένων καὶ κολ. U; διατ. καὶ κολ. A Scl Hns Sch; *omnibus quae perforatu castigantur* G.

10. ὅταν τοῦτο πάθωσι om. G. | ἀπελαθείσης U A Scl Hns Wmr; ἀπερασθείσης conj. Sch-txt; *nimio liberata humore* G. | ἐγχυλότερα U M A Wmr; εὐχυλότερα

in germinating and in maturing because they are naturally cold—these are the ones whose fruits are naked, that is, without integument—and are not active enough to respond to the enveloping stimulus of Spring.¹⁹ Others of them are late because they are naturally dry; for every plant that is dry needs moisture both for food for itself and for ripening of its fruit.

How²⁰ germination extends through both seasons, lasting for a long while (so far as conditions are typical), our remarks should be taken to explain. And, furthermore, it is by the age of the trees and not by the annual return of seasons that their time of bearing is determined. Young plants, for instance, bear late because of their large supply of sap and food in general. Others again, which are far advanced in years, are said to be late in bearing, as is the tree told of in Egypt, which, so the story goes, bears its fruit in its hundredth year only.²¹ But the fig mulberry²² in the same country, because of its abundance of nourishment and great quantity of moisture, cannot ripen unless the fruits are scraped and anointed with olive oil.²³ A large supply of nutriment not only causes lateness of bearing, but, in some plants, it even causes sterility as has been said to be true of vine and almond, and in general of all that require the treatment of being perforated and chastened with pegs.²⁴

For, when they are thus treated, all trees lose some of their fluid, and some of them are changed from sterile to productive, while others have their fruit rendered finer looking and better flavored. For it is said, if the peg²⁵ is driven into an almond tree and then the flow of juice is drawn off, and if this be repeated for two or three years, that the tree will change from bitter to sweet. It seems that the fig also can be changed from

¹⁹ Or, to resist enveloping bad weather (as in Gaza and Wimmer).

²⁰ See Hindenlang, p. 71.

²¹ Not, of course, our century plant (*Agave americana*), which is a native of the western hemisphere.

²² *Ficus sycomorus*.

²³ H. 4. 2. 1, 2 (see Hort's note and reference to Amos 7. 14); cf. C. 2. 14. 1.

²⁴ Urbinas: "blows"; cf. H. 2. 7. 6; C. 5. 16. 3.

²⁵ H. 2. 2. 11; Plin. *N.H.* 17: 253 f. (43).

τῆς δὲ ἀμυγδαλῆς ἂν τις ἐγκόψας τὸν πᾶτταλον ἀποκαθάρῃ τὴν ἐπιρροήν τῆς ὑγρότητος ἐπὶ ἑτῇ δύο ἢ τρία καὶ γλυκεῖαν ἐκ πικρᾶς γίνεσθαι φασιν. δοκεῖ δὲ καὶ ἡ συκὴ ῥιζοτομηθεῖσα καὶ κατασχασθεῖσα εὐφορὸς τε ἐξ ἀφόρου γίνεσθαι καὶ πολυκαρπεῖν μᾶλλον. σχεδὸν δὲ καὶ <τὸ> περὶ τὰς ἀμπέλους τὰς τραγώσας ὁμοίον ἐστίν. καὶ γὰρ τούτων ἀφελεῖν δεῖ καὶ ἀντισπάσαι τὴν εἰς τὴν βλάστησιν ὁρμὴν ὅπως καρποτοκῶσιν.

XVIII. Ἐν τῷ αὐτῷ δὲ πως γένει τῆς αἰτίας ἐστὶ καὶ τὸ μὴ τὴν ἀρίστην καὶ πείραν καὶ βαθύγειον ἀρίστην εἶναι τοῖς δένδροις ἀλλὰ τὴν δευτέραν, τῷ δὲ σίτῳ ἐκείνην. ἐν μὲν γὰρ τῇ <ἀρίστη> κατὰ βάθους ἰούσης τῆς ῥίζης καὶ τῆς χώρας εὐτραφοῦς πλείω τῆς συμμέτρου τροφὴν ἐπισπῶνται, ἐν δὲ τῇ λεπτογείῳ καὶ μὴ βαθείᾳ τὰς ῥίζας ἀναγκαῖον ἐπιπολαιότερας εἶναι καὶ τὴν τροφὴν ἐλάττω καὶ σύμμετρον· ἐπεὶ καὶ ἐν ταῖς ψαφαραῖς καὶ ταῖς πετρώδεσι δύνανται λαμβάνειν ἱκανὴν καθιέντα καὶ βιαζόμενα ταῖς ῥίζαις, ἔτι δὲ καὶ καταψύχειν τὰς ῥίζας ἢ γε πετρώδης δοκεῖ μᾶλλον ὅπερ ἐπιζητεῖ τὰ δένδρα.

(2) ὁ δὲ σίτος ἐν μὲν ταῖς ἀγαθαῖς συλλαμβάνει μὲν πλείω διὰ τὸ μὴ κατὰ βάθους εἶναι τὰς ῥίζας· ἐν δὲ ταῖς μοχθηραῖς καὶ καταξηραίνεται διὰ τὸ μὴ ἔχειν πολλὰς· καταψύξεως δὲ δεῖται διὰ τὸ μὴ κατὰ βάθους

Scl Hns Sch; *suauioris* G. | ἐγκόψας . . . ἀποκαθάρῃ corr. Sch; ἐκκόψας . . . ἐπικαθάρῃ U A Hns (et ἐπικαθ. Scl); *si paxillo deciso* . . . *abstergas* G. | κατασχασθεῖσα corr. Sch; κατασχισθεῖσα U A Hns; *trunco praefixo* G. | γίνεσθαι U; γίγν. A Hns. | <τὸ> add. Sch. | τραγώσας U A; τραχώσας Hns; *articulatis* G. | ἀντισπάσαι corr. Sch-syl; ἀντισπᾶσαι U A Sch-txt. | ἀντισ. . . ὁρμὴν U; ἀντισ. τὴν βλάσ. καὶ ὁρμὴν A Hns Sch-txt; *impetum reuocare quantumque uacans superfluit auferre oportet* G. | καρποτοκῶσιν (in —πο— eras.) U.

1. βαθύγειον U. | τὸ μὴ . . . δένδροις: *quamobrem non pingue altum letumque solum arboribus commodum sit*. G. | <ἀρίστη> conj. Wmr; om. U A Scl Hns Sch. | βάθους corr. Wmr; βάθος U A Scl Hns Sch. | εὐτραφοῦς Wmr; ἀτρεφοῦς M A; εὐτρεφοῦς, U (altero e eras.) Scl Hns Sch. | ἐν μὲν γὰρ . . . εὐτραφοῦς: *Radix enim arboris altae in eo solo descendens imaue subiens succosa* G. | συμμέτρον U. | <τὴν> τροφὴν Sch solus. | ψαφαραῖς A Scl Hns (et U, sed θ super φ scripto et iterum eraso); ψαφεραῖς M; *harenaceis sabulosis* G. | καθιέντα U (et ex M coniecerat Sch-ann); καθιενται M; καθιέμενα A Scl Hns Sch-txt; *Nituntur enim et indisiecta tellure radices* . . . *demittunt*. G. | ἢ γε corr. Sch e G; ἢ γε U A Hns. | ὁ τόπος post πετρώδης add. Hns solus.

barren to fertile and its period of bearing lengthened by trimming off some of its roots and cutting its trunk open. And a very similar treatment is applied to luxuriant grape vines;²⁶ for in them, too, pruning is to be practiced and the incentive to leaf budding removed so as to make them bear fruit.

XVIII

In pretty much the same sort of way we may also explain the fact that soil¹ which is best for trees is not that which is of the finest quality—rich and deep—but that which is of second quality, while, on the other hand, the rich sort is best for grains. For in rich soil, since the root goes deep and the place is very nourishing, trees get more than a balanced amount of food; in lighter soil that is not very deep, the roots must stay nearer the surface and there will be less nutriment and a better balance of it. Then, too, in soil that is crumbling or rocky, trees can obtain enough by running their roots down and forcing them through. Moreover, stony ground seems to make the roots cooler,² a condition which trees seek after.

Grain,³ however, gets more nourishment in good soil because its roots do not go deep; while in poor soil, since it has not many roots, it dries up. It needs cool weather also because its

²⁶ C. 1. 5. 5; H. 4. 14. 6; C. 5. 9. 10.

¹ C. 2. 4. 2, 3, 10.

² C. 3. 4. 3; C. 3. 17. 3; C. 3. 20. 5.

³ H. 8. 6. 4-6; for a more particular discussion see C. 3., Chap. 21.

2. ἐν . . . ἀγαθοῖς: *solo* . . . *frugali* G. | διὰ τὸ μὴ U A M Wmr; μὴ om. G Scl Hns Sch. | εἶναι U M A Scl; ἵεναι Hns Sch-txt; *quoniam alte descendit* G. | Inter πλῆας et ἐν δὲ ταῖς lacunam susp. Wmr. | καταξηραίνεσθαι: *excrecit* G (*mendum*; *exarescit* ap. Hns). | πολλοὺς (in —ας mutat.) U. | καὶ ante καταψύξεως Sch solus. | καταψ. δὲ U; δὲ om. A Scl Sch-txt; καταψ. δ' οὐ (pro δ' οὖν ?) Hns; καταψ. οὖν Scl (cum G: *ergo desyderat*). | κατὰ β. ἵεναι

εἶναι. ὅταν δὲ ἐπομβρίαι γένωνται, οὐ πολλὸς ὁ διασφύζομενος <καί> χείρων ἐστίν. ἐπεὶ καὶ οἱ τῶν δένδρων καρποὶ διὰ τὸ κρατεῖσθαι τῷ πλήθει τῆς τροφῆς ἐξίστανται τῶν γενῶν ὥσπερ ἐλέχθη πρότερον.

(3) ἄτοπον δ' ἂν δόξειεν τὸ τῶν ὁμογενῶν ἓν τὰ μὲν εἶναι πρῶτα, τὰ δὲ ὅψια καθάπερ συκαὶ τέ τινες καὶ ἄμπελοι καὶ μηλέαι καὶ ἄπιοι καὶ τᾶλλα· τῶν γὰρ ζώων οὐδὲν τοιοῦτον πλὴν κυνός, ἀλλὰ παρισόχρονα κατὰ τὰς κησεις καὶ τὰς ἐκτροφάς, ἀλλὰ μόνον παραλάττει ταῖς ὥραις κατὰ τοὺς τόπους καὶ μάλιστα γε ξυνανθρωπεύομενα. τάχα μὲν οὖν καὶ αἱ βλαστήσεις ἐνίων ὕστεραι καὶ παραδιδόασι τὸ ἀνάλογον. οὐ μὴν ἄλλ' ἐφ' ὧν τοῦτο μὲν ἐστὶν ἔοικεν ὥσπερ ἐν ὁμωνυμίᾳ γίνεσθαι τὸ ἀπόρημα.

(4) ἔστι γὰρ εὐθὺ τῇ φύσει καὶ τοῖς ζώοις καὶ τοῖς φυτοῖς ὥσπερ τὰ ἡμέρα καὶ τὰ ἄγρια καὶ τὰ πολύκαρπα, τὰ δ' ὀλιγόκαρπα, τὰ δ' ὅλως ἄκαρπα. τὸ γὰρ τῶν ἐρινέων ἕτερον γένος οὐ δυνάμενον πέττειν οὐδὲ διῖκνεῖσθαι πρὸς τὴν τελείωσιν. ἕτερον δὲ καὶ τὸ τῶν ἀμπέλων τῶν μαινομένων καλουμένων, αἱ οὐ μόνον βλαστάνουσιν, ἀλλὰ καὶ πέττουσι καὶ ἀνθοῦσι καὶ βοτρυνῶνται καὶ οὐ δύνανται τελειοῦν. ὥσαύτως δὲ καὶ τῶν ῥοῶν καὶ εἴ τι ἄλλο μέχρι τοῦ ἀνθους ἀφικνεῖται μόνον. ἐν γὰρ τῇ

(iterum) Sch solus. | ἐπομβρίαι: *imbres crebri* G. | γένωνται A Scl Hns; γέγονται (in —ωντ— correct.) U. | οὐ πολλὸς conj. Sch; καὶ π. U A Scl Hns. | <καί> χείρων Sch; καὶ om. U A Scl Hns. | οὐ πολλὸς . . . ἐστίν: *deterius prae alimentis nimio reddi credendum est*. G. | ἐξίσταν M.

3. τὰ δὲ ὅψια U (cf. Hdng); τὰ δ' ὅψ. A Scl Hns Sch Wmr. | τᾶλλα U; τ' ἄλλα A Hns Sch-txt. | τοιοῦτον U M; τοιοῦτο A Hns. | ἀλλὰ παρισόχρονα corr. Scl (e G); ἄλλα περισσόχ. A (et περρισόχ. Hns); ἀλλὰ περισσόχ. U; ἄλλ' ισόχ. Sch-txt; *sed omnia pari tempore et ferunt in utero et alunt cum peperunt*: G. | κησεις U A; συνήσεις M. | ἄλλα μόν. Sch solus. | γε <τὰ> ξυνανθ. Sch solus. | καιπαραδιδόασι U (primo-δωασιν) A Scl Hns; [καί] ἀποδιδόασι Sch sol.; *portionem absolunt* G. | τοῦτο μὲν ἐστὶν U A Scl Hns; τοῦτο μὴ ἔ. Sch (cum G: *desit*).

4. εὐθὺ τῇ φύσ.: *a natura exhibitum* G. | εὐθὺς . . . καὶ <ἐν> τοῖς ζ. Sch sol. | καὶ τὰ πολὺκ. U M; καὶ πολὺκ. A; τὰ μὲν πολὺκ. Scl Hns Sch-txt; καὶ τὰ μὲν πολ. Sch-syl. | τὰ δὲ ὀλιγ. Wmr solus. | ὥσπερ et τὰ πολύκαρπα et τὰ δ' ὀλιγόκ. om. G. | τὸ γὰρ τῶν corr. Sch ("ex U," sed τὰ habet U); τὰ γὰρ τῶν U A Scl Hns ἕτερον γένος: *sui generis* G. | ἕτερον δὲ καὶ U M; καὶ om. A Scl Hns. | μαινομένων corr. Scl (et habuerat fortasse U, sed inter prima μ et ν rasura est.); μανομ. A. | καὶ πέττουσι delenda censet Sch-ann. | καὶ οὐ δύνανται τελειοῦν ὥσαύτως δὲ καὶ τῶν ῥοῶν om. G. | τελιοῦν (-ιοῦν rec. manu) U. | ῥοῶν Sch; ῥόων

roots are not deep. But when there are rains, much of the grain is destroyed and what is left is of inferior quality. The fruit of trees also will degenerate when, as was said above, they are overpowered by a great quantity of food.

It seems remarkable that, among congeners, some individuals should bear early and others late,⁴ as is true of certain figs, grapes, apples, pears, and others. For among animals no such phenomenon is known except in the dog.⁵ All individuals of the same kind have the same period of gestation and take the same length of time to bring up their young. There is a change in their seasons, however, depending on their habitat, as is especially noticeable among domesticated animals.⁶ There may be an analogy among plants in the matter of their germinating at a later period. But yet in those cases where this fact is noted, it is probable that the difficulty arises from entirely different kinds of plants having the same name.⁷

For it is in direct agreement with Nature that both plants⁸ and animals⁹ are classed as tame and wild, very fruitful, slightly fruitful, or entirely barren.¹⁰ The wild fig is a distinct kind by itself,¹¹ being one that cannot ripen its fruit and bring it through to perfection. The same is true of the so-called "mad-vine"¹² which not only germinates but even elaborates its sap and puts forth flowers and produces clusters, but then cannot bring them to maturity. So also is it in the case of such pomegranates¹³ and other trees that develop only as far as the flower. Now

⁴ C. 1. 10. 5; C. 1. 17. 4; C. 4. 11. 2.

⁵ Aristotle, in *G. A.* 4:4 (772b 10) and *H. A.* 7:4 (584a 33), says that man is the only exception. On the period of gestation in general, see Arist. *G.A.* 4:10; on the dog, Arist. *H. A.* 5: 14 (545b 6); cf. C. 4. 11. 2.

⁶ Arist. *G. A.* 6:18 (572a 6).

⁷ *H.* 7. 5. 3; *H.* 9. 12. 5, etc.

⁸ *H.* 3. 2. 1, 2.

⁹ Arist. *H.A.* 1:1 (488a 27).

¹⁰ C. 2. 11. 1, 10.

¹¹ *H.* 2. 12.2; *H.* 4. 13. 1; *H.* 4. 14. 4; C. 4. 4. 3.

¹² C. 1. 11. 3.

¹³ *H.* 2. 8. 1.

ἰδίᾳ φύσει τὰς διαφορὰς ἕκαστα τούτων ἔχοντα δικαίως ἕτερόν ἂν λέγοντο κατὰ τὸ εἶδος.

(5) ὅσα δὲ δύνανται βλαστάνειν καὶ ἀνθεῖν καὶ πεπαίνειν κατ' ἄλλα καὶ ἄλλα μέρη καθάπερ ἡ μηδικὴ μηλέα ταῦτα μείζω τινὰ ἔχει καὶ ἰδιωτέραν δύναμιν ἐν ἑαυτοῖς εἶπερ αἰεὶ διὰ τέλους τοῦτο δρᾷ· παρόμοιον γὰρ τὸ συμβαῖνον ὥσπερ ἐν τῷ ἀέρι πρότερον ἐλέχθη τῷ μαλακῷ καὶ εὐκράτῳ καθ' ὃν ἡ καρποφορία καὶ ἡ βλάστησις· πλήν ἐκείνων μὲν ὁ ἀήρ αἷτιος διὸ καὶ πᾶσι κοινόν, ἐνταῦθα δὲ ἡ τοῦ δένδρου φύσις καὶ δύναμις εὐκρατος οὕσα πρὸς ἀπάσας τὰς ὥρας.

XIX. Ἐπεὶ δ' ἕτερον τὸ περικάρπιον, τοῦτο γὰρ πρὸς τὴν χρῆσιν ἡμῶν, ἀνάγκη μὲν τούτων ὅρον τινὰ καὶ [τὸν] χρόνον εἶναι, τὸν δὲ ὑπερβάλλοντα λυμαίνεσθαι χειμῶνων τε καὶ ὑδάτων καταλαμβανόντων· τῶν δὲ καρπῶν μὴ εἶναι· συγκαταρρέουσι γὰρ τοῖς προεκπηδῶσιν ὥσπερ οἱ τῆς πιττώδους πεύκης καὶ ὅλως τῶν κωνοφόρων· προσηρημένων γὰρ ἔτι τῶν κώνων ἐκπηδᾷ τὰ κάρνα καὶ καταλείπονται κενοί. ταῦτό δὲ συμβαίνει τοῦτο καὶ ἐπὶ τῶν κυπαρίττων, ἀλλ' ἔνθα μὲν τὸ σπέρμα καρυῶδες, ἔνθα δὲ ὑμενώδες καὶ ἀμενηνόν.

(2) ὅσα μὲν οὖν ξυλῶδεσιν ἢ δερματικοῖς τισι περιέχεται καθάπερ τὰ τε κάρνα καὶ βάλανοι ταῦτα περιστεγόμενα διατηρεῖται πρὸς τὴν τῆς βλαστ-

U A Hns. | ἀπικνεῖται Hns. | ἕτερόν ἂν λέγοντο Wmr; ἕτερον λέγ. U M; ἕτερα ἂν λέγ. A Scl Hns Sch.

5. βλαστάν. κ. ἀνθεῖν κ. πεπαίν. Sch-ann Wmr; πεπαίνειν ante καὶ βλαστ. U G A Hns Sch-txt. | κατ' ἄλλα καὶ ἄλλα U ("cum M" Sch V, p. 89); "καὶ τ' ἄλλα καὶ ἄλλα M" Sch-ann; καὶ τὰ ἄλλα (simplicius) A Hns; κατ' <ἄλλοτ'> ἄλλα Sch-txt; *aliis tamen atque aliis participibus ualeant*. G. | αἰεὶ A Hns; αἰεὶ U M. | <καὶ> διὰ τέλ. Sch solus. | δρᾷ A; ἐρᾷ (sic) Hns. | συμβαῖνον ἐν τῷ ἀέρι ὥσπερ πρότ. Sch-syl solus; ὡς ante πρότερον add. Hns et hab. Sch; *ut supra rettulimus* G. | βλάστησις <αἰεὶ γίνεται> Sch solus; *germinatio et fructificatio facilius assidue potest* G. | κοινόν corr. Sch; κοινός U A Hns. | εὐκρατος οὕσα U; οὕσα om. A Hns Sch-txt.

1. ἀνάγκη (ν eraso) U. | καὶ τὸν χρόνον U M; καὶ om. A Hns; τὸν om. Sch; [τὸν] Wmr; *terminum eius tempusque statutum esse necesse est*. G. | ὑπερβάλλονται Hns. | τῶν δὲ καρπῶν corr. Scl; τὸν δὲ καρπὸν U A Hns; *seminum uero ipsorum* G. | τοῖς προεκπηδῶσιν corr. Scl; τ. προσεκ. U A; τοῦτο τινὲς δὲ προσεκ. Hns; οὗτοι <τοῖς περικαρπίοις> τινὲς δὲ προσεκ. Sch (cum G: *una enim cum pulpis haec defluunt: prosiliunt alia.*). | προσηρημένον (ν rec. man. superscripto) . . . ἀμενηνῶν (in-vón eraso) U.

since each of these trees has distinguishing characteristics in its own proper nature, it might justly be regarded as a species apart.

Those, however, that are able to germinate and bloom and bear in one part after another, as does citron,¹⁴ have a sort of greater and more peculiar power in themselves, if it is true that they keep doing this until the end of their lives. For the phenomenon is similar to what was mentioned earlier¹⁵—the bearing of fruit and germination under mild and benign climatic conditions—except that in that instance the climate was responsible, so that it was a common feature of all of them, while in this case the reason lies in the nature of the tree itself and in its own ability to adapt itself to all seasons alike.

XIX

When the fruit case, which is for man's use, is different from the seed, it must ripen within a limited period, since, after this has passed, the tree will suffer from the onslaughts of winter and rainy weather. There need, however, be no limit for a seed case, since this falls down with the seeds or first shoots them out, as in pitch pine¹ and the conifers generally. In these, while the cones are still fast to the trees, the seeds leap forth and leave them empty. The same thing occurs also in cypress, except that in this tree the seed is membranous and slight while in others it is like a nut.

But all seeds that are enclosed in woody or leathery cases, like nuts and acorns, being well covered, are preserved till the season of germination. Those, on the other hand, that have

¹⁴ H. 4. 4. 3.

¹⁵ C. 1. 13. 9.

¹ Probably Aleppo pine (*Pinus halepensis*). The Greek name used here does not occur in the *Historia* as the name of a tree; but cf. H. 3. 9. 1-5; H. 9. 2. 5.

τήσεως ὥραν. ὦν δὲ σαρκώδη τὰ περικάρπια ταῦτα δὴ σηπομένων καὶ περιρρέοντων αὐτὰ καθ' αὐτὰ σφύζεται, τὰ μὲν ὄντα ξυλῶδη καθάπερ τὸ γίγαρτον καὶ ὁ τοῦ φοίνικος καὶ ὁ τῆς ἐλάας πυρὴν, τὰ δὲ ἐν ὑμέσι καὶ χιτῶσι περιεχόμενα πλείοσι, τὰ δὲ καὶ ἀλλήλοις πως συνημμένα καὶ κοινὴν περιοχὴν ἔχοντα καθάπερ καὶ τὰ τῶν ἀπίων καὶ μήλων· ἅπαντα γὰρ ταῦθ' ὥς εἰπεῖν ἐν μείζοσι περικαρπίοις ἵνα πλείω διαμένη χρόνον. τῶν μὲν οὖν καρπῶν αὕτη φυλακὴ καὶ σωτηρία πρὸς τὴν γένεσιν.

(3) ἡ δὲ τῶν περικαρπίων παραμονὴ ὅρον τινὰ ἔχει καθάπερ ἐλέχθη πρὸς τὴν χρεῖαν. ἐπεὶ καὶ οἱ χυλοὶ χρονιζόμενοι καὶ ἀνυγραινόμενοι χεῖρους γίνονται, τῶν δὲ οὐδὲ πλείους [οὐδὲ] ἀπὸ τίνος ὥρας ὥσπερ οὐδὲ τῶν ἐλαῶν ἀπ' ἀρκτούρου· μέχρι τούτου γὰρ τὸ ἔλαιον ἐγγίνεσθαι δοκεῖ, ἀπὸ δὲ τούτου τῆς σαρκὸς ἡ αὔξησης, καὶ ἕαν γε δὴ πλείω ποιῇ ὕδατα καὶ χεῖρον γίνεσθαι τὸ ἔλαιον ἀμόργην λαμβάνον πλείω, πολλάκις δὲ καὶ σηπομένου τοῦ καρποῦ.

(4) περιμένονσι δὲ <τὴν> πέπανσιν καὶ οὐκ εὐθὺς ἀφαιροῦσιν ὅτι καὶ ἡ κατεργασία καὶ ἡ ἀφαίρεσις χαλεπωτέρα καὶ ἔτι τὰ δένδρα λυμαίνονται ἂν ῥαβδιζόμενα. φαίνεται δ' οὖν εἶπερ τοῦτ' ἀληθὲς ἡ τοῦ θερμοῦ φύσις δημιουργεῖν τὸ ἔλαιον καὶ τὴν λιπαρότητα τοῦ χυλοῦ συμμετρίαν ἔχουσα

2. θερμαντικοῖς M. | ταῦτα δὴ σηπ. U M; τ. δὲ σ. A Hns Sch-txt. | καθ' αὐτὰ U. | τὰ μὲν ὄντα corr. Scl; τὰ μένοντα U A Hns; *per se ipsa sub lignea natura perdurant ut uinaceum*. G. | ὁ τοῦ φοίν. U M; τὸ τοῦ φ. A Hns. | ἐλάας πυρὴν conj. Sch; *ιτέας πυρ.* U A Scl Hns Sch-txt; *ροῖας π.* Scl ap. Hfm; om. G. | πλείωσιν (in -οσιν eras.) U. | πως A; πῶς U Scl Hns. | συνημμένα U. | κοινὴν . . . μήλων: *uasculo communi circumobclusa: uigore certe indomito permanent ut pitorum malorumque semina*. G.

3. ἡ δὲ τῶν περικαρπίων A Hns; ἡ δὲ περὶ τῶν π. U M. | παραμονὴ conj. Wmr; ὁμοία U M; ὁμοίως A Hns Sch; om. G; vide Hlg. p. 36. | ἐπὶ καὶ (in ἐπεί—rec. man. mutat.) U. | χυλοὶ <τῶν μὲν> χρονιζ. Sch-syl. | τῶν δὲ οὐδὲ A Scl Hns; δὲ om. U M. | [οὐδὲ] Wmr (et susp. Sch); πλείους οὐδὲ <καλλίους> ἀπὸ Sch-syl. | τῶν δὲ . . . ἐλαῶν: *Nonnullis quodam tempore post copia largior datur: ut oliuīs* etc. G. (negativis omnibus omissis). | ἐλαῶν ἀπταρ' ἀρκτ. Hns. | ἀπὸ δὲ τούτου Wmr; κατὰ δὲ τ. U (et, δὲ omisso, M); κατὰ δὲ τοῦτο A Hns; μετὰ δὲ τοῦτο Sch. | ἀμόργην (in ἀμόργην eras.) legisse videtur U, quamquam ρ duplex in hoc codice rarissime reperitur. | πολλάκις [δὲ] καὶ Sch-syl; *postea* G. | χεῖρον . . . πλείω: *oleum in amurca deterius redditur* G. | σηπομένου: *ob eandem causam* add. G.

4. τὴν πέπανσιν U; <τὴν> π. Wmr. ex additione Sch; τὴν om. A Scl Hns. |

fleshy pulp about them, though the outer covering rots and falls away, still themselves endure because of their structure, some of them being woody, like the stones of grapes, dates, and olives. Others endure since they are inclosed in numerous membranous coats² and still others because they are in a manner joined together and have a common envelope as do the seeds of pear and apple; for practically all of these have thicker outer coverings in order that they may last longer.³

This protection and conservation of the inner part of the fruit is for reproduction. But the endurance of the outer part is rather limited, as has been said, in reference to its use; for its juices after a time become watery and inferior. In the case of certain trees the fruit juices do not even increase in amount after certain seasons. This is true for instance in the olive after the rise of Arcturus, for up to that time it appears to be producing oil, but afterward the increase is in the fleshy part. If too much rain falls, the oil, too, deteriorates and accumulates too much of the watery lees;⁴ often even the fruit rots.

However men wait for the fruit to ripen and do not gather it immediately because the extracting of oil as well as the gathering of the fruit involves more work if done earlier. Furthermore the trees might be injured by the cudgelling.⁵ If this be true, it would seem that it is the nature of heat⁶ to elaborate the fat in the fruit juice and produce olive oil if there be a proper adjustment between the heat and the tree subjected to it. But too much heat is like a foreign and superfluous element, and goes to waste,⁷ turning too much of the strength of the juices into flesh.

² No examples are given, but Th. is thinking probably of wheat and oats. See H. 8. 4. 1, 3, and cf. Plin. *N. H.* 18: 69 (12), where Pliny has confused grain and stem; C. 4. 13. 4, 5; C. 4. 14. 1.

³ H. 1, Chap. 11, especially sections 5 and 6; C. 4. 1. 2; C. 5. 18. 4.

⁴ *Amurca*, the juice that runs off first in the press. Cf. C. 6. 8. 3; Arist. *Color.* 5: 22. On the olive in general, see Plin. *N.H.* 15: 3 (3), sect. 9 ff.; Varro *R.R.* 1: 55.

⁵ C. 1. 20. 3; C. 5. 4. 2.

⁶ Cf. Plin. *N.H.* 15: 10 (3); C. 6. 11. 7.

⁷ Or, builds up too much undesired material.

πρὸς τὸ ὑποκείμενον. ἡ δὲ πλείων ὥσπερ ἄλλοτρία καὶ ἐπίθετος πρὸς περιττώματος χώραν οἷον ἀντισπῶσα μᾶλλον εἰς τὴν σάρκα τὴν τοῦ χυλοῦ δύναμιν.

(5) δ καὶ τοῦ θέρους καὶ τοῦ χειμῶνος συμβαίνει γινομένων ὑδάτων ἐκ Διὸς καὶ βρεχομένων τοῖς ναματιαίοις ἐν ὁρμῇ τῆς αὐξήσεως οὔσης. ἐκσαρκοῦνται γὰρ καὶ ἀπολλύασι τὸ ἔλαιον διὰ τὴν πολυτροφίαν ἂν μὴ μετὰ ταῦτα αἰθρίαὶ γινόμεναι καταξηράνωσιν, οὕτως δὲ σφύζεται καὶ πληθύνει μᾶλλον. ὅπερ ἤδη καὶ πρότερον πολλάκις γέγονεν, καὶ τὸ τελευταῖον ἤδη ἐπ' ἄρχοντος Νικοδώρου, διὸ καὶ ἡ ῥύσις ἐγένετο καλλίων, ἐκ γὰρ τῶν ἡμίσεων ἡ αὐτῇ. τὰς μὲν πέψεις ὅτι πρὸς τὴν χρείαν τὴν ἡμετέραν εὐρίσκομεν ἐκ τούτων καὶ ἐκ τῶν πρότερον δῆλον ἐν οἷς ὑπὲρ τῶν ἀγρίων εἵπομεν.

XX. Φέρει δὲ τοὺς καρποὺς τὰ μὲν ἐκ τῶν ἔνων τὰ δὲ ἐκ τῶν νέων βλαστῶν διεστῶτα ταῖς φύσεσιν εὐθὺς κατὰ τὰς κράσεις. ὅσα μὲν ξηρὰ καὶ πυκνὰ καὶ ξυλῶδη ταῦτα μὲν ἐκ τῶν ἔνων, ἅτε μικρὰς καὶ βραχείας οὔσης τῆς ἐπιρροῆς· ἅμα δὲ καὶ ὁ βλαστὸς ἀσθενὴς ὥστε μήτε μετενεγκεῖν δύνασθαι μήτε κατασχεῖν ὥσπερ ὁ τῆς ἐλάας. ὅσα δὲ ὑγρὰ καὶ μακρὰ καὶ τὸ ὅλον εὐτραφῆ, ταῦτα ἐκ τῶν νέων· ἀθρόα γὰρ ἡ ὁρμὴ καὶ πολλή, διὸ ἄμφω δύναται ποιεῖν ἅμα τὸν τε βλαστὸν καὶ τὸν καρπὸν. οὐ μὴν ἀλλὰ καὶ

δι καὶ: *quoniam sic* G. | ἀφέρεσις U. | ἡ δὲ πλείων A (et πλείον U); εἰ δὲ πλ. Scl cum G. | περιττώματος χώρ/ν οἷον (inter ρ et ν littera permutata haud legi potest, fortasse α) U; π. χῶρον M A Scl; περιττωμα χωρεῖ Hns Sch-txt; lacunam inter χώραν et οἷον susp. Wmr; *enimvero si calor uehementior sit: non eodem fungi officio potest: sed uelut alienos* (i. e.—us) et *adiectitius quidam defecit*. G. | σάρκα τοῦ χ. (omisso τὴν) U.

5. ἐκ Διὸς om. G. | ναματιαίοις corr. Sch; ναματίοις U A Scl Hns; *scaturientibus aquis* G. | ἐν ὁρμῇ . . . οὔσης “molesta” censuit Scl; *tempore incrementi* G. | ἀπολλύασι U M; ἀπολλοῦσι A Hns; ἀπολοῦσι Scl (“*soluiunt*”); *oleum absumitur* G. | καταξηράνωσιν: *exiecit* (*exsiccat* ap. Hns) atque *attenuet* G. | οὕτως δὲ cum U lego; οὕτω δὲ cett. | πληθύνει U; πλυθείη M (unde πληθύνει jam coniecerat. Sch); πληθύνει A Scl Hns Sch-txt; *exuberare* G. | <ἤδη> Sch. | ἐπάρχοντος (“super —πα—rec. man. addit.) . . . ῥύσις (η *eraso*, neque vero, ut ap. Sch, “*ρυΐσις*”) U. | τὰς μὲν <οὖν> Sch cum Scl. | πέψις (in -εις rec. man. correct.) U.

1. ἔνων: *anniculis* G. | τὰ δ' ἐκ Sch-txt. | ὅσα μὲν <γὰρ> ξηρὰ Sch (“e G”); *etenim* (!) G, qui ξηρὰ om. | μικρὰς . . . ἐπιρροῆς: *parce influant* G. | εὐτραφῆ: *plena* G. | τοῖτοις ἐκ τῶν maluit Scl. | ἐκ τ. <ν.> ἀθρόα γὰρ κτλ. Wmr;

This happens both in summer and in winter if there be too much rain or if the irrigation ditches⁸ be flooded while the trees are in the most active part of their growth. For the olives grow fleshy and lose their oil from over-nourishment unless fine weather follow and dry them up, in which case the oil is saved and becomes still more abundant.⁹ This last circumstance has happened many times in the past, and just lately it occurred in the Archonship of Nicodorus;¹⁰ on account of it the yield was increased, for they got the same amount of oil from half the usual quantity of olives. Ripening is for man's benefit, as we may discover from these facts, and it is clear also from what has before been said about wild¹¹ trees.

XX

Now some trees bear their fruit from the growth of the year before, others from new growth, depending upon their natural differences in constitution. Such as are dry and compact and woody bear on last year's growth because their flow of nutriment is meagre and of short duration, and because, at the same time, the young shoot is weak so that it cannot transmit the juices or support the fruit. A case in point is the olive. But such as are moist and porous and in general easily nourished bear on the new growth; for there is in them a copious and continuous flow; wherefore they can both get their growth and bear their fruit in the same year. Moreover, even those that bear on last year's

⁸ The Greek word seems to me to demand some such rendering: cf. H. 2. 6. 5; H. 4. 2. 9; H. 8. 7. 3; C. 2. 5. 5. See Soph. *Oed. Col.* 685 ff. and Jebb's note.

⁹ See reference to Plin. in the previous section, on the olive.

¹⁰ According to Plin. *N. H.* 3: 58 (9) this was in 313 B.C.—“*Nicodoro Atheniensium magistratu, qui fuit urbis nostrae CCCCXL anno.*” The statement is probably from Diodorus—“in Ol. 116. 3” (314–313 B.C.), whom Schneider (Vol. 4, p. 92) quotes only to question, since, to his mind, the date is too much anterior to an event mentioned in H. 4. 3. 2.—the marching of Ophellas of Cyrene on Carthage in 308 B.C. (Cf. Grote, vol. 12, p. 253 ff.) I cannot see how the difference in time may raise a real difficulty; in any case the Greek phrase could mean “the latest instance was in the Archonship of N.” etc.

¹¹ C. 1. 16. 5, 6.

<τὰ> ἐκ τῶν ἔνων φέροντ' ἀποβλάστημά τι ποιείται μικρὸν καὶ οὐκ εὐθὺς ἐκ τοῦ ξυλῶδους ὁ καρπός· οὐδὲ γὰρ οὐδὲ πέφυκεν ἂν μὴ τι παράλογον.

(2) ἰδιωτάτη δὲ καὶ πρὸς τὰ ἄλλα καὶ πρὸς αὐτὰ τὰ ξυλῶδη τῶν καρπῶν ἡ γένεσις τοῦ φοίνικος, οὐ τῷ φέρειν ἀπὸ τινων ἔνων ἢ νέων, ἀλλὰ τῷ κνούμενον πρότερον ὥσπερ τὰ σταχυηρὰ τῶν σπερμάτων ἐκφαίνεται. ἐκ γὰρ τῶν ὁμογενῶν, ἃ καλοῦσί τινες πλοῖα, περιρρηγνυμένων ἐκφαίνεται καθάπερ στάχυς ἡ ῥάβδος ἔχουσα πρὸς ἑαυτῇ τὸν καρπόν. αἰτιάσαιτο δ' ἂν τις τὴν ξηρότητα τοῦ δένδρου καὶ τὴν ὅλην μορφήν· ἐπεὶ γὰρ φυλακῆς οἱ καρποὶ δέονται καὶ ἔξω συνιστάμενοι καὶ ἐξ αὐτῶν προφαινόμενοι τοῖς μὲν ἄλλοις τὰ φύλλα ταῦτα ποιεῖ καθάπερ εἴρηται· τούτου δὲ ἐπέιπερ οὐ παρὰ τὸ φύλλον ὁ καρπὸς ἀναγκαῖον ἐν αὐτῷ πως τὴν σύστασιν γενέσθαι ὅπως ἰσχύων ἤδη καὶ μεμορφωμένος ἀποδοθῇ τῷ ἀέρι. διόπερ ἐν τῷ συγγενεῖ καὶ οἰκίῳ τὴν κύησιν ἐξέτεκεν. ἴσως δὲ εἴπερ ὅμοιον τὸ σταχυοβολεῖν τοῦτο καὶ πλειόνων ἐστὶ καὶ τὴν αἰτίαν κοινὴν τινα λεκτέον· ἀλλ' εἰ ἄρα μόνον τῶν δένδρων τῷ φοίνικι τοῦτο συμβαίνει· τὸ γὰρ ἴδιον ἐν τοῖς ὁμογενέσι θαυμάζεται· περὶ μὲν οὖν τούτου σκεπτέον.

ἐκ τῶν ἀθρόως τε ἢ ὀρμή κτλ. U M A Scl; ἐκ τῶν νέων βλαστῶν καρποφορεῖ ὅτι ἀθρόως τε ἢ ὀρ. Hns; ἐκ τῶν <νέων> ἀθρόως τε γὰρ ἢ ὀρ. Sch. | ταῦτα . . . πολλή: *hae fructum nouellis germinibus pariunt. His enim in uniuersum uehementerque impetus agitur.* G. | <τὰ> ἐκ τῶν ἔνων add. Sch; *caeterum et quum ex annotinis fructificant.* G. | ποιῆται(-εἶ- rec. man.) U. | οὐδὲ . . . πέφυκεν: *quoniam nec ullo pacto aptum id sit fructum parere* G. | παρὰ λόγον U; *temere* G. |

2. τῷ φέρειν U; τὸ φ. M; γὰρ φέρει G (*enim*) A Hns Sch-txt. | τῷ κνούμ. . . ἐκφαίνεται Sch-syl; τῶν κν'ων U A Hns Sch-txt; *Non enim annotinis quibusdam aut nouellis haec ferre solet: sed his quae praegnans gestae: modo spicati fructum condit.* G. | ἐκφαίνεται Sch-syl; -νει U A Hns Sch-txt. | ἃ . . . περιρρ. (περιρρυγ. in -ρηγ- rec. man. corr.) U solus; *vocabulum πλοῖα susp.* Sch. | ἔχουσα πρὸς ἑαυτῇ: *gerit* G. | τούτου: *Palmae* G. | καὶ <οἱ> ἔξω . . . καὶ <οἱ> ἐξ Sch solus ("cum G": *sive extra consistant: sive intus formati demum erumpant*). | ταῦτα U M; *τοσαῦτα* A Hns; *custodiam illam* G. | ἐν αὐτῷ corr. Wmr; ἐν τούτῳ U A Scl Hns Sch; ἐντὸς vel ἐν τοιοῦτῳ conj. Sch ("e G": *intra arborem*). | γίνεσθαι Sch-txt. | ἰσχύων . . . μεμορφωμένος corr. Sch, cum G: *ut ualidi formatique (sc. fructus) tandem reddantur aeri; ἰσχύων . . . μεμ' ον* U A Scl Hns. | ἔαρι (ae rec. man. superscript.) U. | διόπερ . . . ἐξέτεκεν: *quapropter in utero parentis natura partum seruauit* G; ἐξέθηκεν Hns solus. | τὸ σταχυοβολ./// (litura ultimarum litterarum) U; τῷ σταχυοβολεῖν A Scl Hns Sch-txt. | τοῦτο

growth do not have the fruit right on the woody part; but they send out a small offshoot;¹ for nothing grows naturally from the wood itself except by some anomaly.²

In every respect, but especially in regard to the woody parts of the fruit, the growth of the palm is peculiar in that it does not bear on either a new shoot or on one of the preceding year, but swells as though with young and then brings forth a sort of ear like that of cereals. Those parts, by some called "boats,"³ that are produced together with it break, and the "staff"⁴ is produced looking like a spike with the fruit ranged along it. The reason for this one might assign to the moist nature of the tree and its general form. Now fruit needs protection, whether it develops on the branches or comes out after having developed inside. This protection, as was said,⁵ is provided for other fruits by the leaves; but in this plant, since the fruit is not near the leaves,⁶ its formation must in a measure take place within the tree itself. Being already strong in having passed through certain developmental changes, it may then be exposed to climatic conditions. Wherefore the tree develops its young in a homogeneous and suitable place and then brings it forth. Perhaps, if this phenomenon is like putting forth ears of grain, it is a property of several trees and a common cause is to be assigned for them all. But if, among all trees, it is in the palm alone that this occurs—for peculiarities are the things noted in congeners—then this needs investigation.

¹ Peduncle.

² H. 1. 14. 2.

³ Spathe. For a picture of a similar "boat" see Stras. p. 694, (*Cocos nucifera*).

⁴ Spadix.

⁵ Not in Theophrastus. Schneider (vol. 2, p. 503) refers to Pseudo-Arist. *de Plantis*.

⁶ I.e., after the spadix has shot forth.

καὶ Wmr; τ. δὲ U A Hns Sch. | ἄρα μόνον U A Hns; ἄ. μόνον Sch (prave e Scl: 36. 1. B.) Wmr; tantummodo G. | τῶ φολίῳ: palmarum frondibus G. | ὁμογένεσι U M; ὁμοιογένεσι A Hns; quae generis societate iunguntur G.

(3) παρενιαντοφόρα δὲ καὶ οὐκ ἐπετειοφόρα τῶν δένδρων ὡς τύπῳ λαβεῖν τὰ ξηρὰ καὶ ξυλώδη καὶ ὅσα μὴ ἐκ τῶν νέων ἀλλ' ἐκ τῶν ἔνων φέρει τοὺς καρπούς. οἷον γὰρ προσυλλέξει δει καὶ προγεννήσαι τὸ γεννῶν· οὐ δύναται δ' ἅμα ταῦτα διὰ τὴν πρότερον λεχθείσαν αἰτίαν, ὥσπερ τὰ εὐχυλα καὶ εὐτροφα· μάλιστα δ' ἐπιδήλως ἢ ἐλάα τοιοῦτο καὶ γὰρ ἀσθενέστατον καὶ ἐπικηρότατον καὶ ἅμα ῥαβδιζομένη πονεῖ καὶ κατακοπτομένη τὰς θαλείας· ἐπεὶ ὅσοι γε μὴ οὕτω συλλέγουσιν, ἀλλὰ αὐτομάτως αἰετὴν τὴν ἀπορρέουσιν καὶ ἀποσειόντες ἐπετειοφορεῖν φασὶ μάλλον.

(4) μέγα δὲ καὶ αἱ χῶραι διαφέρουσιν. ἐν γοῦν τῇ Ὀλυνθίᾳ φασὶν ὡς αἰετὶ καρποφορεῖ, παραλλαγὴν δὲ ποιοῦνται κατὰ τριετίαν. ὅσα δὲ ἰσχυρότερα τῶν ἐκ τῶν ἔνων φερόντων οἷας ἂν ὁ θεὸς ἄγῃ τὰς ὥρας οὕτως καὶ τὰ τῶν καρπῶν ἀποδιδόασιν, ὥσπερ καὶ τὰ ἐκ τῶν νέων καρποφοροῦντα. καὶ γὰρ ταῦτα ξυνακολουθεῖ ταῖς ὥραις καὶ τῇ κράσει τοῦ ἀέρος.

(5) συμβαίνει δέ, ὅταν μὲν εὐβλαστῶσιν ἄγαν, ἀκαρπεῖν μάλλον, ὅταν δ' εὐκαρπῶσιν, ἀβλαστεῖν ὡς οὐ δυναμένης εἰς ἄμφω διήκειν τῆς φύσεως, ἀλλὰ καὶ καταναλισκούσης θάτερον πρὸς θάτερον. ἴδιον δὲ τὸ ἐπὶ τῆς συκῆς καὶ τῶν λευκῶν ἀμπέλων συμβαίνειν ὥς τινές φασιν· ταῦτα γὰρ

3. παρενιαντοφόρα et ἐπ'οφόρα corr. Sch; π'όφορα et ἐπ'όφορα U A Scl Hns. | ὡς τύπῳ λαβεῖν: *quoad pingui minerua colligendum sit* (!) G. | ξυλώδη: *praedurae* G. | ἀσθενῇ inter ὅσα et μὴ inserendum cens. Lnk. | προσυλλέξει (primo σ erased) U. | τὸ γεννῶν . . . αἰτίαν: *quae simul hae facere* G. | εὐχυλα corr. Sch; εὐχυλῇ U A Hns Sch-txt; εὐχυλα (pro εὐχυλα?) Scl. | ἐπιδήλως (??) ultimis duabas litteris erasis U. | ἢ ἐλάα: ἐν ἐλ. Hns solus; *quod maxime in olea patescit* G. | τοιοῦτο A Scl Hns Wmr; τοιοῦτον Sch (et U!). | ὥσπερ . . . τοιοῦτο: *quemadmodum quae probe materiatae altaeque sunt; minime queunt* G. | κατακοπτομένης (s erased) U; κατακομένη M; κατακεκομένη A Scl Hns Sch-txt. | θαλλείας U M, cf. Sch 4: 96, 5: 90. | ῥαβδιζομένη . . . θαλείας: *decussa partibus aut praecissa vehementer laborat*. G. | ἐπεὶ ὅσοι U M; ἐπ. καὶ ὅσ. A Scl Hns; *qui enim* G. | ἀλλὰ αὐτομάτως (in -τομ- erased.) U; ἀλλὰ καὶ αὐτ. A Hns Sch-txt. | καὶ ἀποσειόντες U (et conjecerat Sch cum Scl: "*addendam copulam aut disiunctionem, ἢ αὐτομ. ἀπορρέουσ. . . ἢ σειόντες*"); καὶ om. A Hns; *sed aut sponte decidentes: aut manu concussas* G.

4. Ὀλυνθία U (et cum Gallo e Varronis R. R. I. 44, correxerat Sch); Ἀληθεία A Hns; Ἀλθαία conj. Mrs; *alethea* G. | αἰετὶ U M; αἰετὶ A Scl Hns (ut plerumque); *assidue* G. | ποιοῦνται U M A; ποιοῦντα Hns. | ὅσα δὲ ἰσχ. corr. Scl; δὲ om. U M A Hns G. | ἔνων φερ. corr. Scl (e G: *ramis annotinis*); νέων φ. U M A Hns. | ταῦτα γὰρ ante οἷας Hns solus. | ἄγῃ U Scl Hns; ἄγῃ A;

But trees that bear in alternate years only are, as a type at least, practically all dry and woody and they do not bear their fruit on new growth but on that of the preceding year. For it seems as though the generative principle had first to be gathered together and stimulated—a thing which the tree cannot do while it is growing, for the reason given above, as in the case of those with large quantities of juices and nourishment. This is especially noticeable in the olive; for this tree being in fact most delicate and susceptible to injuries, suffers greatly if it be cudgelled or cut while it is in the height of its season. Those who do not gather the olives by the methods just mentioned, but who simply take up what falls of itself or in response to shaking, say that the trees are then more inclined to bear annually.

There are great differences also according to the trees' places of growth. It is said that in Olynthia,⁷ for example, the trees always bear some fruit but that they do show a difference in amount of fruit in alternate years. But of those that bear from growths of the year before, the stronger individuals give of their fruit in return for the sort of season the god⁸ gives them, just as do those trees that have their fruit on the new growth, for these last also bear according to the season and the climatic conditions.

It happens that, when the trees leaf very luxuriantly, they are more likely to be sterile, and, whenever they bear copiously, they are more likely to leaf poorly,⁹ as though Nature could not satisfy both elements of the tree's growth but must spend her resources first on one and then on the other. According to some

⁷ The region about Olynthus?

⁸ Zeus, of course.

⁹ In alternating years.

ἀγει M. | ἀποδιδωσιν (in -δο- eras.) . . . συνακολουθεῖν (ult. ν eraso) U.

5. *δταν μὲν εὐβλαστ.* U A Scl Hns Sch; *μὲν* om. Wmr. | *δυναμένην* M. | *δι' ἀμφω* Sch (mendum?). | *δήκειν* A Scl Hns; *διαρκεῖν* corrigendum cens. Sch (quocum putat Wmr); *utrique satisfacere parti* G. | *λευκῶν* U A; *λεουκῶν* Hns; om. G. | *συμβαῖνον* post *ἀμπέλων* U; post *φασι* A Hns Sch-txt. | *εὐβλάστεια* M

ὅταν εὐβλαστῶσι τότε μάλιστα εὐκαρπεῖ, εἰ δὲ τοῦτό ἐστι καὶ τὸ πρότερον εἰρημένον ἀληθές. ἡ γὰρ εὐβλάστεια ἀφαιρεῖται τοὺς καρπούς· γίνεται δὲ τοῦτο μάλιστα χώρας ἀρετῇ καὶ ἰσχυΐ τῶν δένδρων· ἐν γῇ μὲν γὰρ ἀφθόνῳ τάδε ἐλκῦσαι δεινὰ διὰ τὴν ἰσχύν, ὥσπερ ἡ ἀμυγδαλὴ καὶ ἡ ῥόα.

(6) δῆλον δὲ ὡς ὅσα τὴν φύσιν ἀσθενῇ ταῦθ' ἥκιστα ὑπερβλαστάνει, ἀλλὰ σύμμετρος αὐτῶν ἡ εὐβλαστία γίνεται πρὸς τὴν καρπογονίαν· δεῖ γὰρ μήθ' ὑπερβλαστὲς μήτε κακοβλαστὲς εἶναι τὸ καρποτοκῆσον. ἡ δὲ συκῇ καὶ ἡ ἄμπελος ἡ τοιαύτη μάλιστα λαμβάνει τὸ ξύμμετρον διὰ τὴν ἀσθένειαν. δεῖ δὲ ἴσως καὶ χώραν εἶναι μὴ ἀγαθὴν, ἵνα μηδ' ἐκ ταύτης ἢ ὑπερβολή, διόπερ εἰς τὰς νήσους τὰ τοιαῦτα μᾶλλον ξυμβαίνει. κοινὸς δ' ὁ λόγος περὶ πάντων τῶν ἀσθενῶν. τούτου μὲν οὖν ἐντεῦθεν τὸ αἷτιον ὑπολητέον.

XXI. Ἐν ἅπασιν δὲ τοῖς καρποῖς τὸ περικάρπιον πρότερον μᾶλλον ἢ αὐτός γε ὁ καρπὸς καὶ τὸ σπέρμα γίνεται· τοῦτο δ' οὐ μόνον ὅτι ξυλῶδη καὶ πυρηνώδη γίνεται τὰ πολλὰ τῶν σπερμάτων, τὰ δὲ τοιαῦτα συνίσταται βραδύτερον, ἀλλὰ καὶ ὅτι τέλος ὥσπερ ἐλέχθη τὸ σπέρμα, δεῖ δὲ τὸ ἕνεκα ἄλλου πρότερον ἢ ἐκεῖνό γε εἶναι· ἐν προϋπάρχοντι γὰρ ἡ τῶν τοιούτων

A Wmr; -τῖα U Scl Hns Sch. | Litura inter ἀφαιρ et ται (videtur iasi erasum esse) U. | εὐκαρπεῖ Wmr; -πεῖν U A Hns Sch; *fructificare dicuntur* G. | γίνεται Sch; γίνεσθαι U M A Hns. | ἐν γῇ Wmr; ἐν τῇ U A Scl Hns Sch. | ἀφθόνῳ Wmr; ἀφθονος U M; ἀφθονα A Hns; ἀφθονία <τροφῆς> Sch. | ἐν γῇ . . . ἰσχύν: *Telluris enim eiusmodi alimenti larga copia est.* G | τάδε Wmr; τὰ δὲ U A Scl Hns Sch; *et arbor: quae ualida sit: facile suo robore attrahere possit.* G.

6. δῆλον δὲ ὡς A Hns; δὲ om. U M; *Quamobrem* G. | ταῦθ' . . . ὑπερβλ.: *germinum lasciuiā minime cadit.* G. | γίνεται πρὸς U A Scl; γίνεται om. Hns. | ὑπερβλαστὲς-κακόβλαστὲς U Hns. | ἡ τοιαύτη U A Scl Hns; λέκη mrg-Bas (quod "glossema" appellat Scl; fortasse autem legendum, ut G: *praecipue candida*). | λαμβάνει τὸ ξύμμετρον: *uliginem attrahunt* G (pro τὴν ὑγρότητα vel τὴν ἰκμάδα?). | μὴ ἀγαθὴν: *minus frugale* G. | ταύτης ἡ ὑπερβ. U. | δ' ὁ λόγος U; δὲ ὁ λ. cett. | ἐντεῦθεν τὸ Wmr (ex Sch-ann cum G: *causam petere omnino debemus*); ἐνταῦθα τοῦτο U A Hns Sch-txt.

1. ἅπασιν A Hns. | καρποῖς U A Scl Hns; καρπίμοις Sch-syl; *fructibus* G. | αὐτός corr. Sch-syl (qui autem τε pro γε habet); αὐτοῦ U A Scl Hns Sch-txt. | πρότερον . . . γίνεται: *pulvae et pars exterior: priusquam semen gignitur* G. | δ' οὐ μένον U. | ἀλλ' ὅτι τὸ τέλος Scl; τέλος: *finis fructificandi* G. | ἕνεκα U A; οὐνεκα Scl. | ἐκεῖνο U (et corr. Scl); ἐκεῖνου A Hns. | ἐν προϋπάρχοντι: *non nisi*

persons, however, figs and white grapes are exceptions in that they bear best in their years of luxuriant leafage. Though this be so, still what we observed before is true; for, in general, luxuriant production of leaves does reduce the quantity of fruit. This is especially the case when the soil is good and the trees are strong; for in rich ground trees like the almond and pomegranate, because of their strength, exert a tremendous drawing power.

It is evident that all trees that are by nature weak have least tendency to produce an excess of vegetation; rather do they leaf in balanced proportion to their fruit-bearing. For that which is to bear fruit must have neither too many leaves nor too few. The fig and the vine of the sort mentioned, because of their weakness, just strike a balance; but perhaps, in order that there be no excess, the soil must not be too good. This would explain why trees of this sort are more suitable for growing on islands.¹⁰ This explanation, however, is general for all trees that are less vigorous.

The causes then of these phenomena are thus to be explained.

XXI

In all fruits the outer pulp forms before the seed case and the seed. This is so not only because most seeds are woody and stone-like and, as such, grow more slowly, but because the final purpose of the plant is, as was said, the seed. Now what is for the sake of something else must be produced before that other thing.¹ The origin of such things as seeds of course therefore lies in something preëxistent. In some trees not all the fruit cases are seed bearing.² An instance of this is the small grapes

¹⁰ No doubt Th. has in mind the barren and stony character of many of the Greek Islands.

¹ *I. e.*, the pulp, being for the production of seed, must itself be developed before the seed.

² They do not realize their full natural purpose.

γένεσις. διὸ οὐχ ἅπαντα ἐνίων τὰ περικάρπια σπερμοφόρα καθάπερ τῶν βοτρῶν αἱ μικραὶ ῥάγες ὥς οὐκέτι δυναμένης τελειῶσαι τῆς φύσεως ταύτας· γλυκεῖαι δ' οὐδὲν ἦττον τῶν μεγάλων.

(2) ἢ καὶ δῆλον ὥς ἄρα ῥῶον ἐκπέψαι τὸ περικάρπιον· ἔοικε γὰρ ὑπὸ τοῦ ἡλίου καὶ τοῦ ἀέρος καὶ τῆς ὥρας συνέψεσθαι τὸ δὲ σπέρμα τῆς φύσεως ἰδιώτερον εἶναι. πρὸς ἡμᾶς δὲ τὰ μὲν <ἐν> οὐδενί, τὰ δ' ἐν ἐλάττονι λόγῳ, ἐλάττων γὰρ ἡ χρεῖα, διὸ καὶ τὰ ἀπύρρηνα καὶ τὰ μαλακοπύρρηνα μάλιστα ζητοῦμεν καὶ ἐφ' ὅσον δυνάμεθα τοῦτο σπεύδομεν ὥσπερ οἱ τοὺς βότρυν τοὺς ἀγιγάρτους ποιοῦντες.

ἢ δὲ φύσις δῆλον ὥς ἀμφοῖν ἀποδιδόναί βούλεται τὸ σύμμετρον. (3) ὁπότερος δ' ἂν πλεονάζῃ θάτερον ἐλάττον· τοῦτο δὲ τῶν μὲν δι' ὑγρότητα καὶ ἀπλῶς εὐτροφίαν γίνεται· διὸ καὶ τὴν γεωργίαν ἔφαμεν ξυμπονεῖν. τῶν δὲ διὰ ξηρότητα καὶ πυκνότητα καὶ τὸ ὅλον ἀτροφίαν. καὶ πρὸς μὲν τὴν ἑκατέρου τελείωσιν καὶ πέψιν, τάχα δὲ καὶ τῶν φυτῶν γένεσιν ὅλως καὶ πρωῒβλαστίαν ἅπαντα τὰ τοιαῦτα τὴν τε τοῦ ἀέρος καὶ τοῦ ἡλίου δύναμιν αἰτιατέον καὶ τὰς ἰδίας ἐκάστων φύσεις εἴτ' οὖν ὑγρότητι καὶ ξηρότητι <καὶ πυκνότητι> καὶ μανότητι καὶ τοῖς τοιοῦτοις διαφερούσας εἴτε θερμότητι καὶ ψυχρότητι· καὶ γὰρ ταῦτα τῆς φύσεως.

praecondito aliquo; et uelut iacto quodam fundamento G. | περικάρπια: *fructus* G. | αἱ μικραὶ Sch; αἱ om. U A Hns. | οὐκέτι: *minus* G (ἐτι omisso?). | γλυκεῖαι corr. Sch; γλυκεῖα U A Hns; γλυκεῖς Scl.

2. ἢ corr. Sch; ἢ U A Scl; om. Hns; *ex quo* G. | ἄρα ῥῶον corr. Sch; ἀραιὸν U A Scl Hns; *quam rara aptaque* G. | ἐκπέψαι (μ *eraso*) U. | ἔοικε γὰρ Wmr; ἔοικεν, ὥσπερ U A Hns; ἔοικεν, εἴπερ Sch (cum G: *consistat: si quidem*). τοῦ ἡλίου om. Hns. | συνέψεσθαι U A Scl Hns; συνέψ. δύναται aut συνέψεται conj. Sch; *percoqui: atque dulcescere possit.* G. | τὸ δὲ σπέρμα . . . εἶναι: *quantum semen opus naturae proximus sit* G, (*quamquam . . . proximius* ap. Hns). | εἶναι <δοκεῖ> Sch solus. | <ἐν> οὐδενί Lnk ap. Sch-ann; οὐδὲν U A Scl Hns. | τὰ δὲ ἐν A Hns. | λόγῳ corr. Sch (cum Mld et al.); χρόνῳ U M A Scl; χρεῖα Hns. | ἐλάττειν Hns solus; ἐλάττων ἢ χρεῖα (γὰρ omisso) U. | ἀπύρρηνα corr. Scl (cum G: *fructus qui nucleo uacant*); πύρρηνα U A Hns. | καὶ τὰ μαλακοπύρρηνα U; om. cett. | ἀποδιδόναί . . . σύμμετρον: *modum praescribere* G.

3. ἀπλῶς εὐτροφ. U M A; ἀπ ἀτροφίαν Hns Vnr; *ad summam alimenti copia* G. | τὸ ὅλον ἀτροφ. Scl Hns; —εὐτροφίαν U M A; *in totumque alimentorum inopiae ratione* G. | ἑκατέρου: *eorum* G (simpliciter). | ἅπαντα τὰ τοιαῦτα *menda* aut καὶ ante ἅπαντα *addendum* cens. Sch. | τάχα δὲ . . . τοιαῦτα: *ac forte plantarum et (etiam ap. Hns) omnium generationis germinumque prouentus*

in the bunches, which seem as though Nature were unable to complete them, but which are no less sweet than the full sized grapes.³

Hence we may see how much more easily the outer pulp of the fruit is ripened, for it is probably caused to "ferment" by the sun and air and the season, while the seed is more peculiarly the work of the plant's own nature. So far however as human beings are concerned, the seed offers little or no interest, for its usefulness is slight. Hence we look most for plants whose seeds have no stony covering or whose covering at least is soft, and we strive to develop that kind, as, for instance, seedless grapes. Nature however clearly desires to give an equal balance to both seed and pulp.

Whichever part flourishes causes deficiency in the other: in the pulp, exuberance results from moisture, and, in brief, from abundance of nourishment—thus we speak of husbandry as "laboring together with Nature";⁴ in the seed, on the other hand, exuberance results from dryness and compactness and, in brief, from poor nutrition. In regard to the perfecting and ripening of each part, and perhaps in regard to the generation of plants in general and the matter of early leafing, the explanation is to be sought in all such factors as the influence of the air, and of the sun, and in the peculiar nature of the individual plants—whether they differ in moisture and dryness, compactness and porousness, and such matters, or on the other hand in heat and cold; for these also are matters of nature.

³ Sc. which do have seeds.

⁴ E. g., cultivating and watering to make the pulp grow.

celeris: causas illas reddidisse non dedecet G (i. e. τ. δ. κ. τ. φ. γενέσεως ὄλων καὶ πρωῒβλαστίας αἷτια τὰ τοιαῦτα ?). | αἰτιατέον U A Scl Hns; ἀνακτέον olim fuisse susp. Sch, quocum putat Wmr; omisisse videtur G. | <καὶ πυκνότητι> add. Wmr solus (e conj.).

(4) τούτων δὲ τὰ μὲν ἄλλα σχεδὸν τῇ αἰσθήσει φανερά· τὸ δὲ θερμὸν καὶ ψυχρὸν ἐπεὶ οὐκ εἰς αἴσθησιν, ἀλλ' εἰς λόγον ἀνήκει, διαμφισβητεῖται καὶ ἀντιλέγεται καθάπερ τὰ ἄλλα τὰ τῷ λόγῳ κρινόμενα· περὶ ὧν καλῶς ἔχει διωρίσθαι πως, ἄλλως τ' ἐπεὶ καὶ πολλὰ πρὸς ταύτας ἀνάγεται τὰς ἀρχάς. ἀνάγκη δὲ ἐκ τῶν συμβεβηκότων ἅπαντα τὰ τοιαῦτα σκοπεῖν· ἐκ τούτων γὰρ κρίνομεν καὶ θεωροῦμεν τὰς δυνάμεις.

(5) μία μὲν οὖν αἰτία λέγεται τῶν θερμῶν καὶ ψυχρῶν ἢ εἰς τὸ κάρπιμον ἀνάγουσα καὶ ἄκαρπον ὡς τῶν μὲν θερμῶν καρπίμων ὄντων, καθάπερ καὶ ἐπὶ τῶν ζώων τῶν γονίμων καὶ ἀγόνων καὶ τῶν ζωοτόκων καὶ ὠοτόκων. ἑτέρα δ' ἢ κατὰ τὰς χώρας θερμὰς ἢ ψυχράς· τὰ γὰρ ἐναντία ἐν ταῖς ἐναντίαις δύνασθαι διαμένειν, τὰ μὲν θερμὰ ἐν ταῖς ψυχραῖς, τὰ δὲ ψυχρὰ ἐν ταῖς θερμαῖς. οὕτως γὰρ εὐθὺς καὶ τὴν φύσιν γεννᾶν ὡς ὑπὸ μὲν τοῦ ὁμοίου φειρομένων διὰ τὴν ὑπερβολήν, ὑπὸ δὲ τοῦ ἐναντίου σφριζομένων οἷον εὐκραςίας τινὸς γινομένης. ὥσπερ καὶ Ἐμπεδοκλῆς λέγει περὶ τῶν ζώων· τὰ γὰρ ὑπέρπυρα τὴν φύσιν ἄγειν εἰς τὸ ὑγρόν.

(6) συνηκολούθηκε δὲ ταύτῃ τῇ δόξῃ καὶ Μενέστωρ οὐ μόνον ἐπὶ τῶν ζώων, ἀλλὰ καὶ ἐπὶ τῶν φυτῶν· θερμότητα γὰρ εἶναι φησι τὰ μάλιστα ἔνυγρὰ οἷον σχοῖνον κάλαμον κύπριον, διὸ καὶ ὑπὸ τῶν χειμῶνων οὐκ ἐκπῆγνυσθαι· καὶ τῶν ἄλλων ὅσα μάλιστα ἐν τοῖς ψυχροῖς δύνασθαι διαμένειν, οἷον

4. φανερόν U. | ἐπεὶ περ . . . ἀνήκει U M; *quia non sensu: sed ratione percipi possint* G; om. A Hns. | ἀνίκη (ἀνήκει rec. man.) U. | τὰ ἄλλα . . . κριν.: *quae ratione solummodo diiudicare ualeamus* G (pro τὰ ἄλλα δ τῷ λόγῳ κρινόμεν ?). | ἄλλως τ' Wmr ex Sch (ἄλλως <τε>) qui καὶ ante ἐπεὶ transponendum censuit; τε om. U A Hns G; *de quibus alia quodam (quodam ap. Hns) ratione determinasse bene est: quin etiam* etc. G.

5. αγωνων (in —γον— eras.) U. | ζωοτόκων A; ζωοτόκων U. | καθάπερ . . . ὠοτόκων: *ut etiam in animalium genere animantes: quam oua gignentium: licet intelligi*. G. | ἑτέρα δ' ἢ corr. Wmr; ἑτέρα δὲ U; ἐτ. δὲ A Scl Hns Sch. | θερμὰς ἢ ψ. Wmr; θ. καὶ ψ. Sch-ann; θερμὸν καὶ ψυχρὸν Scl; οἷον ψυχράς U A; οἷον ψυχράν Hns; *Secunda pro regionum natura hoc est ratione frigiditatis* G. | διαμένην (—ην eras.) U. | θερμὰ ἐν τ. ψυχραῖς corr. Scl (qui autem ψυχροῖς mendum hic habet); θερ. ἐν τ. θερμαῖς U A Hns; *calida frigidis* G. | ψυχρὰ ἐν τ. θερμαῖς corr. Scl; ψ. ἐν τ. ψυχραῖς A Hns; ψ. ἐν ψ. (omisso ταῖς) U; *frigidis calidis*. G. (His locis emendationem facit, ut Scl cum G, item Palm. *Exerc.* pag. 604.) | οὕτως γὰρ U; οὕτος γ. M; οὕτω γ. cett. | εὐθὺς: *principio* G. | σφριζομένων U. | εὐκραςίας . . . γινομένης: *medio quodam exultante temperamento* G. | γινομένης U M; γεν. A Scl Hns Sch-txt. | τὰ γὰρ . . . ὑγρόν: *Quae enim calida sunt: haec*

Practically all of these factors are manifest to our senses, but the matter of heat and cold in plants, since it is not perceptual but rational, is a disputed point, as is everything else that is judged by reason alone. About these it is well to make distinctions to a certain extent, especially since many other matters are referred to these as principles.⁵ Now we must examine all such matters from actual phenomena, for it is from the latter that we judge natural forces and examine them.

The first reason given for belief in heat and cold in plants is the one that refers to fertility and sterility, namely that the fertile plants are the warm ones, just as there is a distinction made in animals between those that bear and those that are barren, between also the viviparous and the oviparous.⁶ The second reason has to do with the places where the plants grow, whether these be warm or cold, for it is supposed that opposites can endure amid opposites (warm plants in cold places and cold plants in warm places). For in this way Nature fashioned them at the beginning, that they should perish from an excess of their like but be preserved by their opposite through a sort of resultant favorable tempering. This is precisely what Empedocles means when he says, about animals: "Nature leads the extremely fiery individuals into the midst of the moist element."

Menestor,⁷ too, has adopted this doctrine, not only for animals but for plants as well; for, says he, the warmest plants are those that are most aquatic, as rush, reed, and gallingale⁸—wherefore also these are said not to be frozen by winter—and of other sorts the warmest are all such as can best persist in cold

⁵ Cf. Arist. *G.A.* 3: 1 (751b 6) and 3: 4 (755a 20 ff.)

⁶ Arist. *G.A.* 2: 1 (732b 31 and context), and 4: 1 (765b 17).

⁷ Quoted also in H. 1. 2. 3 and C. 2. 4. 3. See Sprengel *Hist. Rei Herb.* Tom. I, p. 64 (German edit. 1: 51).

⁸ *Juncus* spp., *Arundo donax* (?) *Cyperus longus*; see Th-D.

humidis in locis collacasse naturam asserit. G.

6. συνηκολούθησε Sch-txt solus (quod in syll. et auct. rejecit). | φυτῶν: *plantis uniuersis* G. | θερμότερα U; -τερα A Scl Hns Sch-txt; *calidiora* G. |

ἐλάτην πεύκην κέδρον ἄρκευθον κιττόν. ἐπὶ τούτου γὰρ οὐδὲ τὴν χίονα τῇ θερμότητι ἐπιμένειν· ἔτι δὲ σκολιὸν εἶναι διὰ τὴν ἐντεριώνην θερμὴν οὔσαν καὶ διαστρέφειν.

(7) τρίτην δ' αἰτίαν λέγει τοῦ πρῶϊβλαστῆ καὶ πρῶτκαρπα εἶναι· φύσει γὰρ καὶ ὁ ὁπὸς αὐτὸς ὦν θερμὸς καὶ βλαστάνειν πρῶτ' ποιεῖ καὶ πέττειν τοὺς καρπούς· σημείον δὲ ποιεῖ καὶ τούτου τὸν κιττόν καὶ ἕτερ' ἄττα. τετάρτη δ' ἡ τῶν ἀειφύλλων· διὰ γὰρ θερμότητα καὶ ταῦτα οἶεται διατηρεῖν, τὰ δὲ ἐνδεία τούτου φυλλοβολεῖν. προσεπιλέγει δὲ τοῖς εἰρημένοις καὶ τὰ τοιαῦτα σημειούμενος ὅτι τὰ πυρεῖα ἄριστα καὶ κάλλιστα ἐκπυροῦνται τὰ ἐκ τῶν ἐνύδρων ὥς τὰ μάλιστα τοῦ πυρὸς ὄντα τάχιστα ἐκπυρούμενα. καὶ τὰ μὲν ὑπὲρ τῆς θερμότητος λεγόμενα σχεδὸν ταῦτ' ἐστίν.

XXII. Ἔχει δ' ἀπορίαν εὐθὺς ἐπὶ τοῦ πρώτου λεχθέντος ὥς οὐκ ἐστὶ τὰ καρπιμώτερα θερμότερα. τὰ γὰρ θήλεα τῶν δένδρων πολὺν καρπιμώτερα μὲν, ἥττον δὲ θερμὰ τῶν ἀρρένων ὅπερ ἐκ τῆς τῶν ζώων ὁμοιότητος ληπτέον καὶ μὴ ὁμωνύμως. ἔτι δὲ οὐδὲ τὰ ζῶα τὰ πολυγονώτερα θερμότερα οὐδὲ

σχοῖνον κάλαμον κύπειρον: *iuncum arundinem gladiolum* G. | ἐπιπήγνυσθαι ap. Scl (item ἐκπήγ.). | χειμόνων (in -μων- corr.) . . διαμένην (in -ειν corr.) U. | δύνασθαι διαμένειν U A; δύναται διαμ. Sch-ann (quod malim); *haec plus caloris sortiri* add. G. | ἐπὶ τούτων (mendum ?) Scl (qui "*scilicet hederā*" alibi habet); *super his* G. | τῆς θερμότητι (in τῇ eras.) U. | Post ἐπιμένειν, *scilicet ratione caloris* add. G; (ἐπιμένην U,—rec. manu correct.). | εἶναι διὰ <τὸ> τὴν Sch solus. | σκολιὸν . . . διαστρέφειν: *tortuosa haec eadem esse: peruertique ob calorem medullae asserit.* G.

7. αἰτίαν λέγει corr. Scl; —λέγειν A Hns et U (sed *ν* eraso). | πέττειν U (et hab. Scl); πέττει A Hns Sch-txt; καὶ ante πέττ. om. U solus. | τὸν κιττόν Wmr; τὸν τε κ. U A Hns Sch; κιττόν susp. Sch cum Lnk (at confert I. 10. 7.). | ἕτερ' Wmr; ἕτερα U A Hns Sch. | δ' ἡ U; δὲ ἡ A Scl Hns Sch Wmr. | ἐνδεία τούτου U M; ἐνδ. τοῦ A; ἐνδ. τοῦ θερμοῦ Hns Sch-txt; *quae . . . calorem desyderant* G. | φύλλουβολην (-ου et -ην erasis) U. | προσεπιλέγει U (et corr. Scl); -γειν A Hns. | τὰ τοῖα U. | πυρεῖα Hns; πύρεια U; πύρια M A Scl; *ignaria* G. | τὰ ἐκ τῶν ἐνύδρων Wmr; —ἐνύδρων Sch (cum Mld e G; *quae ex plantis aquatilibus fuerint*); καὶ τῶν δένδρων U M A Scl Hns. | ὥς τὰ μάλιστα Wmr; ὥς μάλ. τὰ Sch; ὥστ' αἰεῖ τις τὰ U A et, omisso τὰ, M; ὥς αἰεῖ τὰ Hns; ὥς αἰεῖ τις τὰ Scl; ὥς τὰ πλείστον conj. Mld. | τοῦ πυρὸς ὄντα U M A Scl Hns; τ. π. ἔχοντα Mld; τ. π. πλείον ἔχοντα Sch; *tamquam celerius ignem edere illa possint quorum natura plus in se caloris contineat.* G. | τῆς πλείον ἔχοντα θερμ. Hns. solus.

1. τὰ γὰρ: *et enim* G (pro καὶ γὰρ ?). | πολὺν καρπ. Sch; πολυκαρπ. U M A; πολικ. Hns. | ὅπερ ἐκ Sch (e G: *quod*); ὥσπερ ἐκ U A Hns. | ὁμωνύμως

places, for example silver-fir, fir, cedar, Phoenician cedar,⁹ and ivy.¹⁰ (On the last named, because of its warmth, even snow cannot stay.) Menestor says, moreover, that ivy curls because its pith, being warm, twists it about.

The third reason is one which Menestor gives—early production of leaves and fruit; for, when sap itself is naturally warm, it causes early appearance of the buds and early ripening of the fruit. As evidence for this he cites the ivy and the other plants mentioned with it above. The fourth reason is found in the evergreens; for it is because of their warmth that they are also able to retain their leaves, while those that lack that quality are deciduous. To the statements quoted he adds further some such observation as this: the best and most readily ignited fire sticks¹¹ are those made from aquatic plants. This statement is made on the theory that fire will most readily catch in that which is naturally moist. These in general are the statements made about plant warmth.¹²

XXII

About the first explanation given, however, a question at once arises on the ground that it is not the more fertile trees that are the warmer. For "female" trees are much more fertile but are less warm than the "males," a fact which must be accounted for by its likeness to what occurs in animals and not by mere similarity in terminology. Moreover, the more prolific animals are not the warmer, nor, on the other hand, are the colder the less productive. Examples are furnished by the carnivorous and gluttonous beasts. For of the warm animals it

⁹ *Juniperus phoenicea*, H. 4. 1. 3.

¹⁰ "Makes the best fire sticks," H. 5. 9. 6, 7 (if the conjecture is correct); cf. *de Igne* 64.

¹¹ See H. 5. 9. 6-8.

¹² These statements are criticized by Th. in Chap. 22.

ανάπαλιν ψυχρότερα τὰ ὀλιγογονώτερα καθάπερ τὰ σαρκοφάγα καὶ λαίμαργα. μόνα γὰρ τῶν θερμῶν δοκεῖ κύνων καὶ ὅς πολυτοκεῖν. αὐτῶν δὲ τῶν ὁμογενῶν τὰ ὁμοειδέστερα πολυγονώτερα, καθάπερ ἐπὶ τῶν ὀρνίθων. ἡ γὰρ θερμότης ἐξαύξειν φαίνεται καὶ διαρθροῦν τὰ μέλη καὶ σκληρύνειν.

(2) ἀλλὰ καὶ εἰς τὴν ζωογονίαν καὶ εἰς τὴν καρποτοκίαν καὶ πέπανσιν συμμετρίας τινὸς δεῖ τοῦ θερμοῦ καὶ οὐχ ὑπερβολῆς, εἴπερ αὕτη μὲν ξηραίνει καὶ πυκνοὶ μᾶλλον. ὥστε ταῦτα μὲν ἐν ἀμφιδόξῳ, προσδεόμενα δὲ τινος διορισμοῦ. περὶ δὲ τῶν ἐνύδρων ῥάων ἡ ἀμφισβήτησις· οὐ γὰρ οὔτε γεννᾶν οὔτε εὖ τρέφειν οὔτε σφῆζειν πέφυκε τὸ ἐναντίον, ἀλλὰ τὸ ὁμοιον, ἐπεὶ καὶ Ἐμπεδοκλεῖ πρὸς τοῖς ἄλλοις καὶ τοῦτ' ἄτοπον, ὅπερ καὶ ἐν ἐτέροις εἴρηται, τὸ γεννήσασαν ἐν τῷ ξηρῷ τὴν φύσιν μεταίρειν εἰς τὸ ὑγρόν· πῶς γὰρ ἂν διέμενεν ἢ πῶς οἶον τε καὶ διαμένειν ὄντιναοῦν χρόνον εἴπερ ἦν ὁμοία τοῖς νῦν;

(3) ἔτι δ' αὐτὸ τὸ συμβαῖνον κατὰ τὴν νῦν γέννησιν ἀποσημαίνει, ἅπαντα γὰρ φαίνεται τὰ ζῶα καὶ τὰ φυτὰ καὶ διαμέροντα καὶ γεννώμενα ἐν τοῖς οἰκείοις τόποις ὁμοίως ἔνδρα καὶ χερσαῖα καὶ εἴ τις ἄλλη τοιαύτη διαφορά.

Scl; -μον U A Hns; *cognatione nominis* G. | οὐδὲ τὰ . . . πολυγ. θερμ. U; τὰ . . . πολυγ. θερμ A Hns; <καί> τὰ . . . πολ. <οὐ> θερμ. bene conj. Scl; <οὐ> sine <καί> hab. Sch-txt; *Item animalia quamvis quae fecundiora sunt: calidiora intelligantur: tamen non e contra: quae minus fecunda: frigidiora ut quae carniuora gulosaque sunt.* G. | οὐδὲ . . . ψυχρότερα . . . ὀλιγ. corr. Sch e G; οὐδὲ . . . θερμότερα. . . ὀλιγ. U M; om. A Scl Hns; οὐ μὴν πάλιν τὰ ἀγονώτερα ψυχρότερα conj. Dlc. | καθάπερ τὰ σαρκ. U Scl (τὰ Scl e conj.); καὶ καθ. σαρκ. A Hns. | ὁμοειδ. Wmr; ὁμοιοειδ. U A Scl Sch (qui autem vocabulum cum Lnk susp: "μικρότερα?"); ὁμοιοδ. Hns; *quae speciem similem expressius gerunt* G. | ἐξαύξειν . . . διαρθροῦν: *immodice augere coartare* G.

2. εἴπερ . . . μᾶλλον: *si quidem calor nimius exiccet maioremque immodum candes uel candescant et necesse sit* G (—*in modum condenset necesse sit* ap. Hns). | διορισμοῦ (in διορ-eras.) U. | περὶ δὲ U; περὶ <δὲ> Wmr cum Sch (e G: *de aquatilibus uero*). | οὔτε γεννᾶν om. G. | ἐπεὶ καὶ Ἐμπ. . . εἴρηται: *unde Empedocles inepte illud quoque asseruit* G (multo simplicius); ἐπὶ (mend.) καὶ Ἐμπ. κτλ. Scl. | γεννήσαν M. | ἐν τῷ ξηρῷ U M A; ἐν om. Hns; *in arido* G. | ἂν διέμενεν U; ἂν διέμεινε M A Scl Hns Sch-txt. | ἢ πῶς U M; καὶ πῶς A Scl Hns; (διέμεινεν ἢ πῶς οἶονται καὶ διαμένει M). | ὄντινα οὖν U (in ὄντιναοῦν eras. ut habent Sch-syl et Wmr); ὄντινοῦν A Scl Hns Sch-txt. | *Quo enim pacto animantes aquarum incolae: uel quantumlibet tempus persistere in arido potuissent si*

seems to be only the dog and the swine that have numerous young at a time, and of their congeners the nearer they are to their type¹ the more prolific they are. This is also illustrated in birds; for heat appears to cause their members to grow and articulate and harden.²

Both for reproduction in animals and for bearing and ripening of fruit in plants there is needed a balanced quantity of heat but not an excess of it. The latter tends to dry and shrink the offspring or fruit. These matters, as involving differences of opinion, require additional definition. The difficulty about aquatic plants, however, is more easily solved, for it is the nature not of opposites but of likes to generate, nourish, and preserve. Empedocles, therefore, to his other mistakes adds this, in a different context, when he declares that Nature transfers to the wet that which has been engendered³ in the dry.⁴ For how would they have stayed on land or how could they have⁵ stayed for any time whatever if they were creatures like those that now exist?

What occurs in the matter of reproduction at the present time is a demonstration of the point. For all alike, both animals and plants, are seen to remain and reproduce in places suited to themselves, whether they be aquatic or terrestrial creatures or whatever difference of habitat distinguish them. Wherefore

¹ I.e., the more they resemble dog or swine respectively.

² Thus tending more to somatic than to reproductive growth.

³ The participle is active though the sense demands the passive—a strange use in this verb.

⁴ Fish. Empedocles taught that they were produced in the dry and then driven into the wet. (See Scaliger *ad loc.*)

⁵ Reading, with Scaliger and others, a past rather than a present unreal condition.

modo his nostri temporis similes fuerint; G (confuse).

3. *ἔτι δὲ . . . ἀποσημαίνει: Item quod norstis (sic) temporibus in generationem euenire sentimus rem plene declarat. G. | γένησιν Hns. | διαμένοντα . . . τόποις: tum generari: tum permanere suo tantum in loco posse uidemus G (qui μόνον ἐν τοῖς forte habuit. Nota prioris membri transpositionem.). | ἐνυδρα U A; ἐρυγρα M. | ἄλλη τοιαύτη U A; ἄλλη τε αὕτη M. | ὁμοίως . . . διαφορά om. G.*

διὸ καὶ ἀπαθῇ μὲν ὑπὸ τούτων παθητικά δ' ὑπὸ τῶν ἐναντίων ἅτε μεγάλης τῆς μεταβολῆς γινομένης.

(4) ἀσύμφωνοι δὲ καὶ αἱ δόξαι πρὸς αὐτὰς ὅταν ἅμα τε τὰ ἔνδρα θερμότερα ᾗ καὶ τὰ καρπιμώτερα· πολλὰ γὰρ ἄκαρπα τῶν ἐνύδρων· καὶ πάλιν ὅταν τὰ τε πρωῒβλαστῇ καὶ πρωῒκαρπα καὶ τὰ αἰέκαρπα καὶ αἰέφυλλα θερμὰ λέγωσιν· ὀψικαρπότατα γὰρ ὡς εἰπεῖν τὰ αἰέφυλλα. καὶ τὸ ὅλον ὥσπερ πρότερον εἴρηται, <τὰ> πρωῒβλαστῇ καὶ πρωῒκαρπα δι' ἀσθένειαν, ἔνια δὲ καὶ συμπαρακολουθεῖ βλαστάνοντα καὶ ἀνθούντα πλείω χρόνον ὥσπερ καὶ ἐν τοῖς ἐπετείοις ὁ ἡριγέρων ἔχων δῆλον ὅτι συμμετρίαν τινὰ κατὰ τὴν ἐπιρροὴν τῆς τροφῆς.

(5) ὁ δὲ προσεπιλέγει περὶ τῶν πυρέων οὐκ ἂν τις ἴσως φαίη θερμότητος, ἀλλὰ ξηρότητος εἶναι σημεῖον· ἡ γὰρ τρίψις ἐστὶν ἡ ποιοῦσα τὸ πῦρ· σφοδρότερα δὲ ἐν τούτοις, ᾗ καὶ μᾶλλον ἐξαερὸν δυναμένη τὸ ὑγρόν. ἀλλὰ δὴ μάλιστα ἐκεῖνα φαίνεται καὶ κατὰ τὴν αἴσθησιν θερμὰ καὶ κατὰ λόγον τὰ λιπαρά τε καὶ τὰ δριμέα καὶ εἶσσμα οὕτως ἔχει· πάντα γὰρ ταῦτα ἐν θερμότητι δοκεῖ εἶναι. διὸ καὶ ξηρά τε ὄντα καὶ ὡς ἐπὶ πᾶν

διὸ καὶ ἀπαθῇ . . . γινομένης: *quo circa suo quoque loco affici nequeunt. Contrario et aduerso affectionibus parent: ut pote cum distractio et permutatio magna ita accedat. G.*

4. καὶ αἱ δόξαι U M; καὶ om. A Scl Hns; *praeterea oppiniones G.* | ἐνδρα corr. Sch; ἐννυρα U A Hns; *Aquatilia G.* | καὶ τὰ καρπ. U; τὰ om. A Hns Sch-txt; *Aquatilia namque calidiora simul: et fecundiora inquirunt esse. G.* | πάλιν ὅταν . . . λέγωσιν U A; πάλιν . . . λέγουσιν (ὅταν omisso) Hns; *Rursus quae etc. G.* | ὀψικαρπότατα U (et corr. Sch); -πώτατα A Hns. | εἴρηται <τὰ> πρωῒβλ. Sch; τὰ om. U A Hns; (πρωῒβλαστα Scl). | ἔνια δὲ καὶ συμπαρακολουθεῖ U A Scl Hns Sch; ἔνια δὲ παρακολουθεῖ Wmr; *Nonnulla . . . plus temporis protrahunt G.* | ἡριγέρων ἔχων U (et conj. Sch e G: *quod . . . oblineat*); —έχων M; —έχει A Hns. | κατὰ τὴν ἐπιρροὴν om. G.

5. προσεπιλέγει U (et corr. Scl); -γειν A. | *πυρέων U, et corr. Scl: "lego . . . πυρίων, non πυρίων"* (sic); *πυρήνων A; ignariis G.* | ἀλλὰ ξηρότητος Mld ap. Sch; ἀλλ' ἀνθρωπότητος U A Scl ("*quid sit hic ἀνθρωπότητος nescio*") Hns; ἀνθρωπότητος conj. Rob. Const.; *vehementis conflictus G* (unde σφοδρότητος conjicio). | ἐν τούτοις U A; ἐν τοιούτοις εἰ καὶ κτλ. G. | ᾗ καὶ Wmr; ἡ καὶ U A Hns Sch-txt; εἰ καὶ conj. Sch-ann e G; ᾗ καὶ Lnk ap. Sch-ann. | δυναμένη susp. Sch. | σφοδρότερα . . . ὑγρόν: *quod si in huiusmodi lignis humor magis extenuari: conuertique in aerem facilius possit: id contritus uehementiae: non caloris insitii rationi tribui debeat. G.* | κατὰ λόγον U A; τὰ κ. λ. Hns; κατὰ τὸν

they are unaffected by their like, but are affected by their opposites, as can be seen in the great changes which result from the influence of the latter.

The opinions held are not even consistent with themselves when they would imply that, at the same time, both the aquatic and the more fertile individuals are the warmer—for many of the aquatic varieties are sterile—and again they are inconsistent in saying that not only those that leaf and fruit early but those also that continually bear fruit and leaves are warm. Now evergreens are practically the latest trees to bear, and in general, just as has been said,⁶ early leafing and early bearing are the result of weakness. Some trees, however, keep budding and blooming along for a greater period, just as does groundsel⁷ among the annuals, which plant clearly has a certain balance in the flow of nourishment.

What he says further about fire sticks one might well say is not an indication of heat but of dryness; for it is friction that produces the fire. Now friction is more effective in wood such as that of the aquatic plants,⁸ and so is more able to evaporate the moisture. In truth, however, to both our senses and our reason, those appear to have the most warmth that are fatty, pungent, and fragrant, for all such⁹ seem to belong to the warm sort. Wherefore also these, being dry and in general dense and

⁶ E. g., C. 1. 17. 3. and references.

⁷ *Senecio vulgaris* (Th-D ap. Hort. p. 451); H. 7. 7. 4; H. 7. 10. 2.

⁸ Perhaps a naturalistic explanation for Prometheus's theft would be that the *narthex* was used as a fire stick by means of friction. The primitive mind would think of the fire as hidden in the fire stick.

⁹ He is thinking of resinous trees such as were used for torches.

λ. Sch-txt; οὕτως ἔχει om. G. | πάντα om. G. | δοκεῖ ἐν θερμότητι εἶναι U M Sch-syl Wmr-Did; ἐν θερμ. δοκ. εἶν. A Scl Hns Sch-txt; δοκοῦσι θερμότητα εἶναι Wmr; *caliditatem proculdubio sortita videntur* G. | ξηροτέον ὄντα (primo ον ερασ) U. | ἐπὶ πάν Wmr; ἐπὶ πάν U A Hns Sch; om. G. | χυλοῦς: *succum*

πυκνά καὶ ἀσαπῇ καὶ τοὺς χυλοὺς ἔχοντα λιπαροὺς καὶ δριμεῖς [ὅθεν τέ ἐστι καὶ ἄφρων] καὶ ἡ πύκη θερμὴ καὶ εὐπύρωτός ἐστιν· οὐ μὴν μόνον γε ταῦτα, ἀλλὰ καὶ ἄλλα δοκεῖ θερμὰ εἶναι καθάπερ καὶ ἡ φίλνυρα καὶ ὅλως ὅσα τὴν τοῦ σιδήρου βαφὴν ἀνίσχουσιν.

(6) χρὴ δὲ καὶ ταῖς τοιαύταις δυνάμεσιν ἀθρεῖν τὰ θερμὰ καὶ ἐπικρίνειν. οἷον ὅσα κατὰ τὰς προσφορὰς τοῖς σώμασι θερμότητάς τινας ἐμποιεῖ καὶ πέψεις ἢ συντήξεις ἢ καὶ τὸ ὅλον κατὰ τὴν ἀφὴν καὶ τὴν γεύσιν διαδίδωσι τὴν αἴσθησιν· οὐ γὰρ ἔτι ταῦτα λόγου δεῖται πρὸς τὴν πίστιν, ἀλλὰ καὶ ἡ τῶν ἱατρῶν χρεία μαρτυρεῖ καὶ ἡ αἴσθησις· ὥς δ' ἐπὶ τὸ πᾶν πλείω ταῦτα ἐν τοῖς θερμοῖς ἢ ψυχροῖς ἢ οὐκ ἐλάττω γίνεται· διὸ καὶ πρὸς τὴν ἐν τοῖς ἐναντίοις γένεσιν καὶ τοῦτ' ἀμφισβητεῖται.

(7) τὸ μέντοι παρέπεσθαι τινα τροφὴν εἰς τὸ διαμένειν ἐν τοῖς ψυχροῖς ἔνια τῶν θερμῶν τάχ' ἂν τις συγχωρήσειεν· ἀλλὰ τὰ ποῖα καὶ πῶς τοῦτο πειρατέον διορίζειν, εἰ μὴ ἄρα ἀπλῶς ἰσχυρὴν τιμὴν μᾶλλον ἢ ῥιζῶν ἢ τῶν ὅλων σωμάτων ἢ διαμονή, καθάπερ καὶ τῆς ἀπίου καὶ τῆς ἀχράδος καὶ τῆς ἀμυγδαλῆς, ἃ δὴ καὶ ἥκιστα ἐκπῆγνυται. καὶ περὶ μὲν θερμότητος ἐκ τούτων ληπτέος ὁ διορισμός.

(sing.) G. | λιπαροὺς U; -ρεῖς A Hns Sch-txt. | τέ ἐστι καὶ ἄφρων om. G; susp. Sch; *δάφνη hic latere censuit* Dlc. | εὐπύρωτος U (et corr. Scl); εὐπύρωτος A; (ἀπύρωτος mendum ap. Scl,—95. 2. D.); *perfacilis igniti accedit* G. | ἡ φίλνυρα U M; ἡ om. A Hns Sch-txt; *tilia* G. | ὅσα . . . ἀνίσι: *quae ferri aciem hebetant* G.

6. θερμότητος . . . πέψεις . . . συντήξεις: *calorem cocturamque aliquam uel iabem* (sing.) G. | συντήξεις e G corr. Scl (qui καὶ pro ἡ habet); συντάξεις U A. | τὸ ὅλον om. G. | αἴσθησιν <τῆς θερμότητος> οὐ γὰρ Hns et Sch-txt (e G *sensum caloris*); τῆς θερμ. om. U M A. | καὶ ἡ αἴσθησις om. G. | δ' ἐπὶ τὸ πᾶν U A Hns; δ' ἐπίπαν Sch-txt; *Parte autem fere tota* G. | πλείω . . . ἐλάττω: "*Imo uero plerumque in calidis, in frigidis oligis*" Scl; *plura . . . pauciora* G. | κ. πρὸς τὴν ἐν τοῖς ἐν. γένεσιν Wmr (ex Sch-ann et lectura false Urbinatis dicta, quae ap. Sch reperitur); κ. προστε (τε εрас) τοῖς ἐν. γένεσιν (in -σι εрас) U; διὸ καὶ πρὸς τοῖς ἄλλοις περὶ τὴν ἐν τοῖς γένεσιν conj. Sch-ann; κ. πρὸς τοῖς ἐν γέν. A Hns Sch-txt; κ. ἐν τοῖς ἐν. γένεσι Scl; *quamobrem contrariis generibus id quoque ambiguitatis adiungitur* G.

7. τροφὴν susp. Sch-ann. | καὶ πῶς τοῦτο: *et quonam modo sic constent* (ταῦτα pro τοῦτο ?) G. | διορίζειν (ω in o εрас) U. | ἡ διαμονή: *perdurare* G. | καὶ τῆς ἀχράδος om. G. | ἃ δὴ . . . ἐκπῆγνυται corr. Sch-syl; ὦ (in δ εрас) δὴ . . . ἐκπ. U; τὸ δὴ . . . ἐμπῆγνυσθαι M; καὶ δὴ καὶ ἡκ. ἐμπ. A; καὶ δὴ <τοσοῦτον ψυχὸς ἀνέχεται ὥστε> ἡκ. ἐμπ. Hns Sch-txt; ὥς καὶ ἡκ. A-Bas;

decay-resisting and having juices that are thick and pungent, are warm¹⁰—the fir, for example, is hot and easily kindled—and not these alone but others seem to be warm, as does the lime¹¹ and, in general, all that dull the edge of the axe.

It is from qualities like these last that we ought to observe and decide what are hot, as for example all the trees which, from the food they have received, generate a sort of warmth in their bodies and produce ripening or liquefaction, or those that in general give a sensation of heat to the taste or touch. For then there is no longer need of appeal to reason for belief; but we have the testimony of the medicinal use¹² they serve and of our own senses.¹³ On the whole, more plants of this type grow in warm than in cold places; at least no fewer do. Wherefore this also disagrees with the statement about growth among opposites.

However it would probably be granted that certain foods do aid some of the warm plants to stay in cold places; but one ought to attempt a definition of what these are and how this is accomplished, unless they endure simply by virtue of some qualities of their roots or of their whole plant organization, as in the case of pear, wild pear, and almond, which are really only slightly subject to freezing. It is from these points of approach that our determinations about plant heat must be made.

¹⁰ After *warm*, the Greek adds, "whence also he is a fool," possibly referring, if genuine, to the inconsistencies that Menestor is involved in by the facts.

¹¹ *Tilia platyphyllos* (Th-D p. 482).

¹² *E. g.*, mustard plasters; cf. Plin. *N.H.* 20: 238 (87).

¹³ Condiments, spices, etc. (See Whibley *Comp.* I. 4. sect. 98).

et hinc etiam rigori adeo resistere queant ut minime concreescere possint. G. |
περὶ δὲ τὰς βλαστήσεις καὶ καρποτοκίας τῶν δένδρων addit Urbinas ad finem
 libri; iisdem verbis repetitis incipit liber alter. (Nonne haec eadem verba
 priore casu pro titulo in antetypo ante inceptum librum inscripta sunt?)
 Inter libros litteris uncialibus parvis stant: ΘΕΟΦΡΑΣΤΟΥ ΠΕΡΙ ΦΥΤΩΝ
 ΑΙΤΙΩΝ ΤΟ Β.

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THE TEXT OF THEOPHRASTUS

- * Codex Urbinas (Vat. M^s 61): Theophrasti De Causis Plantarum (I-VI), fol. 142 B to fol. 269 B, in photostat made for me in the Vatican by P. Sansaini of Rome.¹
- * Theodori Graeci Thessalonicensis (Gazae) Libri Theophrasti de Plantis quos ex graeca lingua latinos fecit. Theoph. De Caus. Plant. Liber I. (In photostat made from the copy in the Widener Branch of the Free Library of Philadelphia.)² Tarvisii, 1483.
- * Theophrasti De Historia Plantarum, Theodoro Gaza Interprete. Parisiis, 1529.
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¹ My thanks are due to Mr. Gorham P. Stevens and Dr. A. W. Van Buren, of the American Academy in Rome, and to Professor W. D. Crockett, of the Pennsylvania State College, for their kind aid in securing the permission needed to have the photostat made, as well as for having Sansaini accomplish it.

² To Miss Margaret H. Miller of that Branch, and to Mr. Franklin H. Price of the Phila. Public Library I am indebted for their making possible the securing of this photostat. I have examined, in the vaults of the Cornell Univ. Library, a copy of this extremely rare book; a copy is listed in the library catalog of the College of Physicians and Surgeons of Phila., but I was unable to see it or confirm the fact.

³ To Dr. William L. Taylor, a Fellow of the College, I would express my thanks for securing for me the making of this photostat. A copy of this work also I have examined in the Cornell vault.

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¹ In the footnotes to my translation, references to Pliny are made to both the Teubner and the Bohn editions: the first two numbers refer to book and section in Jan's edition; the number in parenthesis refers to the section of the given book in the Bohn translation.

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